

FACTORY ORGANIZATION

A Textbook for Class XII

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राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

First Edition

March 1993 : Chaitra 1915

Second Reprint Edition

September 1993 : Asvina 1915

P.D.&T – RNB

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Cover: D. K. Shende

— OFFICES OF THE PUBLICATION DEPARTMENT, NCERT —

NCERT Campus	CWC Campus	Navjeevan Trust Building	CWC Campus
Sri Aurobindo Marg	Chitlapakkam, Chromepet	P.O. Navjeevan	32, B.T. Road, Sukkur
NEW DELHI 110016	MADRAS 600064	AHMEDABAD 380014	24 PARAGANAS 743179

Rs 9.00

Published at the Publication Department by the Secretary, National Council of Educational Research and Training, Sri Aurobindo Marg, New Delhi 110016, laser typeset at Computer Alley, A14/3, Third Floor, Jamuna Bhawan, Asaf Ali Road, New Delhi 110002 and printed at New Age Printing Press, 5-F, Rani Jhansi Road, New Delhi 110055.

Foreword

The syllabi and textbooks brought out by the NCERT in various subjects for different stages of school education have sought to reflect the major thrusts in the National Policy on Education which was adopted in 1986. Business Studies is an important elective subject at the higher secondary stage. In developing the syllabi and textbooks for this subject, particular attention has been paid to the modernization of its content, especially in terms of its relevance and employment linkages.

The present book is a part of the series of textbooks that the NCERT has brought out in this important area. It deals with Factory Organization, which is one of the optional courses provided for in the syllabi in Business Studies. The textbook aims at providing the necessary academic grounding to those pupils who intend taking up some manufacturing activity of their own or assisting in the management of a manufacturing unit or a factory owned by their family. It is also expected to develop the knowledge and competencies which are necessary for pursuing professional courses like Cost Accounting.

The book has been prepared by a writing team comprising Ms. Rekha Dayal, Dr Minakshi Mitra, Dr Minoo Nandrajog, Ms. Hema Prabha and Professor D.S. Saini. The manuscript was finalized after detailed discussion at three workshops, which were attended by experts and practising teachers.

I am grateful to the experts who served on the writing team as also to the others whose comments and suggestions were crucial in giving the book its present shape. I am particularly thankful to Professor D.S. Saini for his guidance and advice at all stages in the development of the manuscript. He also assisted in editing and finalizing the entire manuscript. My colleague Dr Minoo Nandrajog deserves special mention for co-ordinating the entire work relating to the preparation of this book.

We would welcome comments and suggestions from the readers on any aspect of this book for its further improvement.

Dr K. GOPALAN
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Preface

Factories, as is well known, are the most important constituent of business system. The waves of economic liberalization world over, and in India especially since July 1991, have injected greater interest in newer areas of manufacturing activities. And, prospective entrepreneurs are wanting to examine the multifaceted problems involved in factory organization.

Even though the problems relating to licensing and the regulatory framework of business are getting diluted, challenges of intense competition are likely to pervade business in coming times. Greater efforts will be needed for increased efficiency through, among others, cost minimization, product differentiation, and employee development. These issues give rise to questions involving not just the setting up of factories and arranging finances for them. Important aspects of layout, building design, departmentation, material control and storage have also to be articulately managed. Questions relating to recruitment and employment conditions of factory workers too are equally important in this regard.

The efforts in this textbook have been to provide a comprehensive treatment to the above-mentioned issues in factory organization. It has been written primarily to cover the course in Factory Organization, a part of the subject *Business Studies for Class XII*. However, others interested in this area will also find it a useful introduction to the subject.

The book includes a systematic discussion of the subject. The chapters have been written strictly in conformity with the syllabus. They are arranged section-wise with sub-headings for the respective sub-topics of the concerned chapter. The text has been written in a simple and clear manner so as to make it understandable to the readers, as also to help them to prepare for their examinations. Each chapter is followed by summary of its contents and questions relating to the concerned topic sub-divided into three categories, viz. objective-type, short-answer type, and essay-type questions.

The NCERT organized three workshops to review the drafts written by the team. The workshops were attended by experts in the field from universities and colleges. They consisted of Professor R.G. Saxena, Professor in Commerce, DESSH, NCERT, now in Delhi University, Professor V.P. Giri of Manipur University, Shri S.K. Tandon and Shri I.A. Qureshi of Delhi College of Arts and Commerce, University of Delhi. We are grateful to Dr K. Aswathappa of Bangalore University for his assistance in resolving many difficult issues. The participants made invaluable suggestions during the course of revisions of the draft manuscript. We have immensely benefited by their association with the textbook.

We have spared no efforts to make the book useful to the students and teachers, and shall look forward to their considered opinions and responses for improving the text.

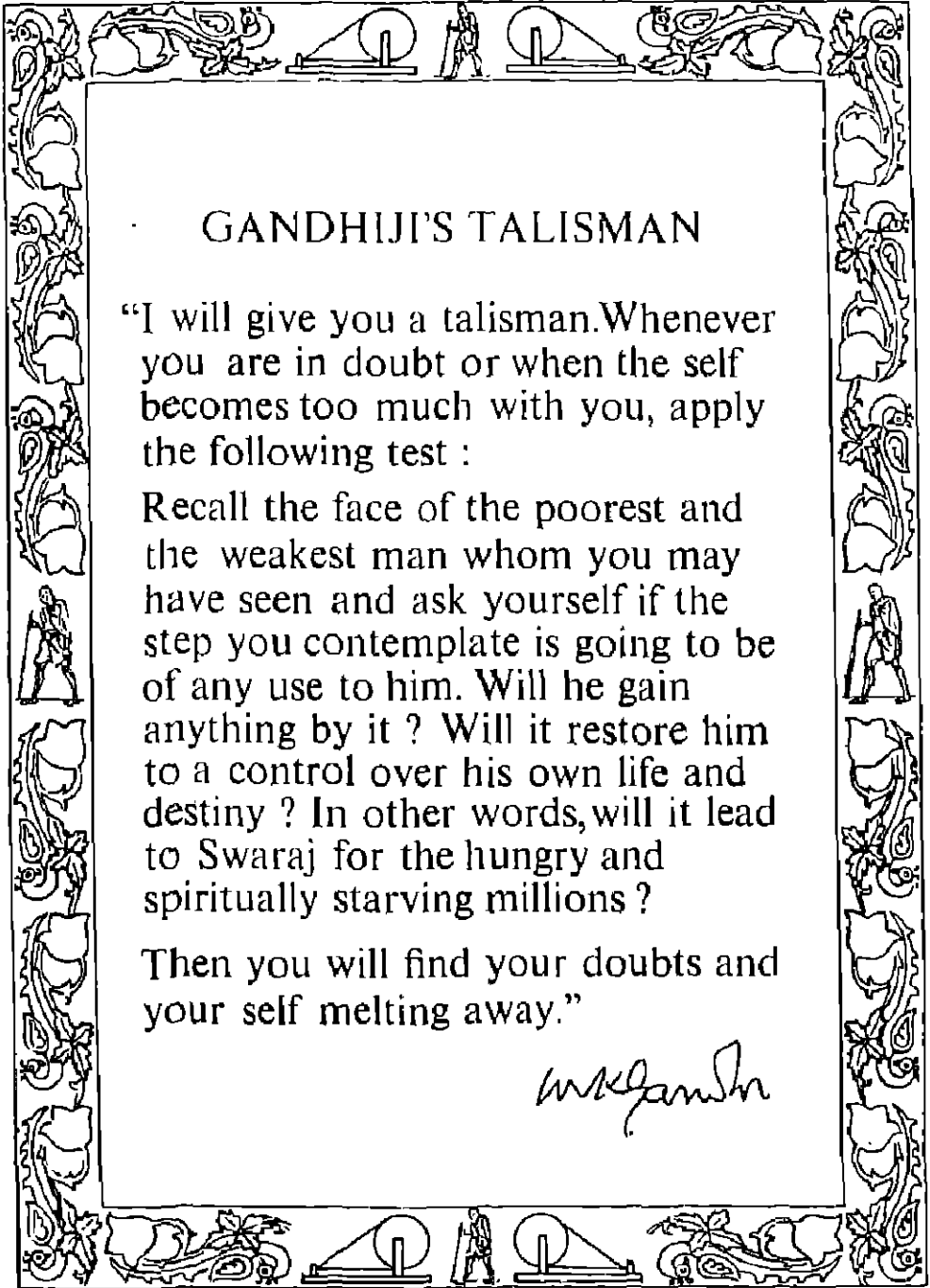
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GANDHIJ'S TALISMAN

"I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test :

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it ? Will it restore him to a control over his own life and destiny ? In other words, will it lead to Swaraj for the hungry and spiritually starving millions ?

Then you will find your doubts and your self melting away."

M.K. Gandhi

CHAPTER 1

Nature of a Factory and Its Characteristic Features

LEARNING OBJECTIVES

After reading this chapter you should be able to —

- explain the meaning and characteristics of manufacturing activity;
- differentiate between manufacturing, mining and agricultural activities;
- outline the characteristics of seasonal and perennial manufacturing activities and distinguish between them;
- explain factory and workshop;
- explain the term 'factory' as given in the Factories Act, 1948;
- outline the characteristic features of a factory, as commonly understood; and
- examine the characteristic features of small and large factories.

1.1 Introduction

Factories occupy a unique place in a nation's economy. They are the key source from where manufactured goods are derived for the satisfaction of human wants. They provide employment to thousands of people. Thus, factories are an important aspect of the economic life of people. The social life of the people is also influenced by factories producing goods and services as per the changes in the people's tastes and income levels. They enable us to appreciate the role played by technocrats, workmen and industrialists in the production of goods and services. To the prospective job-seekers, they help in planning their careers.

The concept of factory, we thus note, is of multi-faceted importance. The students of business studies will, however, be most interested in its economic and organizational aspects. We should, therefore, first understand the meanings of the terms 'factory' and 'organization'.

A factory, simply speaking, refers to a place where raw materials and semi-finished goods are converted into finished products. In this process the factors of production—land, labour, capital and enterprise—are brought together to realize the goals and objectives of the concerned organization. The term is often used interchangeably with the words 'plant' and 'works'. It is important to note that a factory is

not merely raw materials, machines or buildings. The human element is the most important part of a factory. That is why it is said that "factory is people". It is the people who organize and carry on the production process in a factory. The functioning of the factory depends on the organizational capability of those who carry on and manage it. Thus, the words 'factory organization' are very important to understand.

'Organization' here refers to a planned process through which the resources of an enterprise in men, materials, machines and money are brought together. An organization is thus the totality of tangible and intangible factors. The study of factory organization helps in understanding the production process and the problems associated with it. It encompasses an understanding of the problems involved in product selection, plant location, plant layout, building construction, installation of machinery, procurement and control of raw materials, recruitment and motivation of personnel, and production of goods and services and controlling their quality.

In the present times, a factory manager has to take into account several factors in order to organize and manage a factory efficiently. Modern managers have to encounter problems like energy crises, steep inflation, keen competition, technological obsolescence, workers' unrests, etc. These issues make their work more complex. In this chapter, our primary focus will be on the nature of manufacturing activity, and the various ways in which it can be organized. This will help us later to explore the other aspects of factory organization which we have noted above.

1.2 Nature of Manufacturing Activity

As we are aware, the scarcity of resources gives rise to economic problems. Economics is concerned with the creation and distribution of wealth. Wealth takes the form of goods or services

or a claim on goods and services such as money. Goods mean tangible articles like food, cars, refrigerators, yarn, clothes, etc. Services, on the other hand, are intangibles like banking, insurance, health services, etc. Goods needed must be produced or manufactured.

Manufacturing activity involves a change in the form of raw materials to satisfy human needs. The term 'manufacture' comes from the Latin word 'manus', which means 'hand', and 'facture', which means 'making'. In modern times, however, manufacturing refers to goods made by hand as well as machines. Production of these raw materials have to be treated or processed and moved from one place to another before they acquire a market value. For example, wood has to be transported, processed and then sold as furniture, etc. The manufacturing activity thus brings about a change in the form of raw materials into finished or semi-finished goods through a conversion process. This is illustrated with the help of Fig. 1.1.

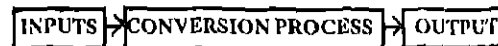


Fig. 1.1 The Manufacturing Process

The manufacturing activity requires a man-designed and machine-assisted process, through which raw materials are transformed into finished or semi-finished goods. The inputs required in this process are land, labour, capital and enterprise. These inputs are also called the factors of production.

(i) *Land* : Land is used to describe all natural resources used in production, including land itself, mineral deposits, and climate.

(ii) *Labour* : By 'labour' we mean effort of any sort. It may be in the form of skilled, unskilled or semi-skilled labour.

(iii) *Capital* : 'Capital' refers to the stock of man-made resources, which is available for

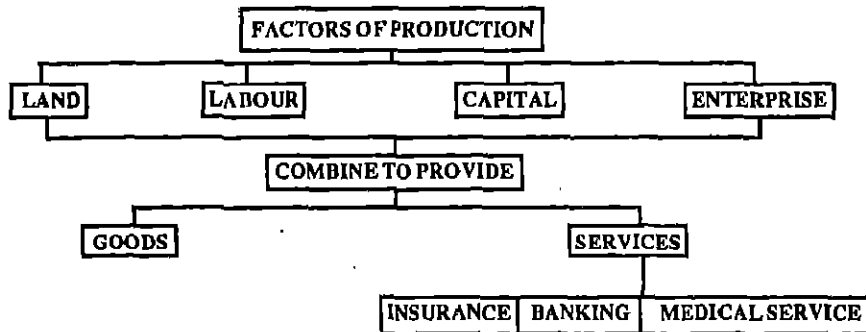


Fig. 1.2 Factors of Production

assisting in further production. This includes both fixed and working capital. The former includes buildings, machinery, equipment, etc., and the latter consists of investment in raw materials, stock of partly finished goods, unsold finished goods, etc.

(iv) *Enterprise* : Enterprise is the function of the entrepreneur. It brings together all factors of production, and coordinates and performs the function of risk-taking.

In some processes of manufacture the finished product at one stage becomes the raw material or component part of the next stage. For example, processed iron acts as raw material for machines and tools. The conversion or transformation process used may be simple or complex, depending on the size of the unit.

1.2.1 Characteristics of Manufacturing Activity

As we have noted earlier, manufacturing activity provides us with goods and services for use. The characteristics of manufacturing activity are the following:

(i) *Use of Raw Materials* : Manufacturing activities require raw materials for production, which may be weight-losing or non-weight-losing. Some raw materials lose their weight during production process e.g. coal, sugarcane, etc. Others, however, do not lose their weight in the conversion process e.g. cotton, wool, jute, etc.

In certain cases, the finished products of one manufacturing activity become raw materials for other production process. For example, processed aluminium, iron, zinc, etc., are further converted into goods like aluminium rods, iron sheets and ingots, etc.

(ii) *Use of Tools and Machinery* : Manufacturing activity involves the use of tools and machinery in the production process. The type of tools and machinery used depends on the kind of techniques involved in the manufacturing process. In the case of simple processes sophisticated technology may not be used e.g. cotton weaving is done through handlooms. Where the process used is more complex, advanced technology may be required. For example, chemical industries, pharmaceutical concerns, and automobile units require modern methods of production.

(iii) *Conversion of Raw Materials* : Manufacturing activity brings about a change in the form of raw materials to convert them into saleable products, e.g. raw cotton into textiles, sugarcane into sugar or jaggery, iron ore into steel and machines, etc.

(iv) *Scale of Operations* : Manufacturing activity may be carried out on a small, medium or large scale. Book-binding, bakeries, toy industries, village-and-cottage industries are examples of small units. On the other hand, ship

building, chemical plants, fertilizer units, etc., produce goods on a large scale.

(v) *Seasonal or Perennial Activity* : Manufacturing activity may be carried out throughout the year, making it a perennial activity e.g. industries manufacturing synthetic cloth, steel, electrical appliances, etc. Production in some cases is carried out only for a part of the year, making the industry seasonal e.g. cotton-ginning, oil processing, brick-making industries, etc.

1.3 Manufacturing, Mining and Agricultural Activities

We have just understood the meaning of 'manufacturing'. It will now be useful to compare manufacturing activity with some other major activities like mining and agriculture. Production of goods and services is carried out through primary, secondary and tertiary activities. Primary industries include all those activities which are connected with extracting, producing, and processing of natural resources. These industries are classified as:

- (i) extractive industries, and
- (ii) genetic industries.

Extractive industries involve extraction of the produce from natural sources, like timber from forests and minerals from the earth. In such cases, products are directly consumed or are used as raw materials for further treatment. Mining activity forms a part of this group. Thus, mining activities are those which involve extraction of minerals from the surface of the earth, for example, coal, iron, aluminium, gold, bauxite, etc. Genetic industries, on the other hand, include activities connected with breeding and rearing of animals and growing plants. Agricultural activity forms a part of this group.

Secondary activities are concerned with the materials which have already been produced at the primary stage. Manufacturing industries are a part of this group. For example, mining of gold and silver are primary industries while manufacture of ornaments and utensils takes place in the secondary sector. This has been explained with the help of Fig. 1.3.

Manufacturing activity differs from mining and agricultural activities. It brings about a change in the form of goods by creating form utility. These activities may be carried out on a small

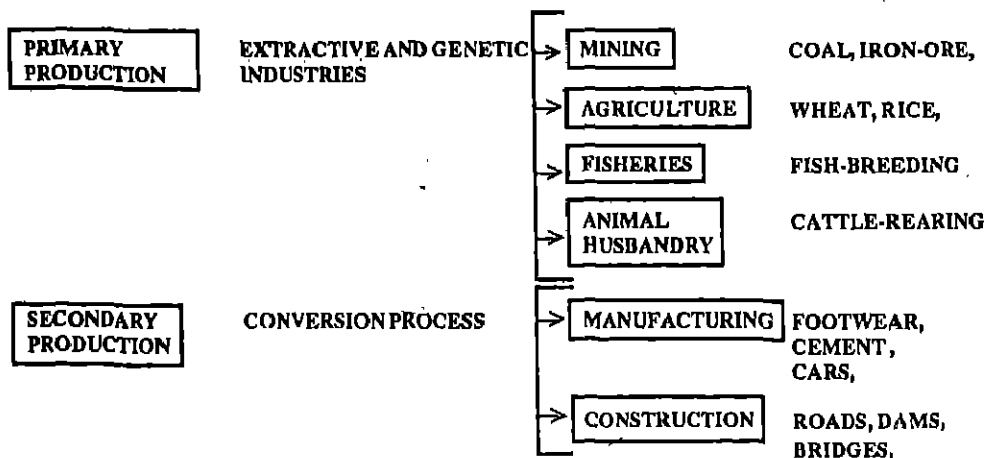


Fig. 1.3 Primary and Secondary Industries

scale, using simple tools and equipment, or on a large scale, using more complex machinery. Increased mechanization in manufacturing industries leads to mass production of commodities. This activity can be carried out anywhere. Mining activity, on the other hand, cannot be carried out at all places. It is possible only where deposits are located at expected sites. Agricultural activities, like mining, are dependent on certain factors. These include fertility of soil, irrigation facilities, favourable climatic conditions, etc. In the case of agricultural activity, man can improve upon the produce and even preserve the natural resources of land by means of crop rotation, use of fertilizer, and better irrigation facilities. In the case of manufacturing activity modern techniques of production and management can be used to enhance output.

Manufacturing units produce the following types of goods:

- (i) Consumer goods : soaps, T.V. sets, washing machines, edible oil, etc.
- (ii) Intermediate goods : cement, steel, etc.
- (iii) Capital goods : machinery and equipment, etc.

Agricultural produce provides items to satisfy the basic want, e.g. wheat, rice, vegetables, fruits, etc., as also raw material to the industrial sector in the form of commercial crops like sugarcane, cotton, jute, oil seeds, etc. Mining produce is concerned with output which is directly consumed or is used as raw material, e.g. coal, gold, silver, etc.

Agricultural produce can be raised with a little investment. On the other hand, manufacturing activity requires more capital and longer gestation period. Mineral deposits cannot be increased at a particular place. It is limited in that respect. However, the output of the mining industry can be increased by using machines and modern methods.

Investment in agricultural activity is directly put to productive use as in the case of digging of a tubewell, use of tractors, etc. On the other hand, manufacturing activity may involve certain basic facilities like institutional arrangements, social overhead facilities such as transport, communication and power, etc. These facilities may not lead to direct increase in physical output. Agricultural activities operate on the law of diminishing returns. In the case of manufacturing activity diminishing returns may not apply.

Distinction between Manufacturing, Mining and Agriculture

Points	Manufacturing	Mining	Agriculture
1. Raw Material	Change in the form of raw material	Form remains the same	Basic form remains the same
2. Scale of production	Large, medium or small scale	Dependent on the expected output	Can be carried out on a large, medium or small scale
3. Investment	Needs more investment for infrastructure (Other facilities)	Needs less investment	Can be carried out with small investment
4. Diminishing marginal returns	May not apply	Takes shorter time to operate	Sets in at a shorter time period

1.4 Seasonal and Perennial Manufacturing Activities

Continuing the discussion on the meaning of 'manufacturing', it may be added that a manufacturing activity may be 'seasonal' or 'perennial' depending on the length of time during which production is carried out. Seasonal manufacturing industry is one which carries on production only for a part of the year e.g. sugar industry, decortication of groundnuts, cotton-ginning, etc. In perennial industries, on the other hand, production is carried on throughout the year e.g. automobiles, cotton textiles, synthetic cloth, etc.

1.4.1 Characteristics of Seasonal Industries

The characteristics of seasonal manufacturing industries are as follows:

(i) *Availability of Raw Materials* : Certain manufacturing industries become seasonal in nature due to the availability of raw materials for a fixed period of time only. The raw material may be available only during a part of the year so that these units are forced to function during this time period e.g. sugar, food processing industries, etc.

(ii) *Dependence on Climate* : Some manufacturing units may not be able to produce during certain seasons. For example, brick kilns require hot sun for the output to dry. Thus, during the monsoon these units are not able to produce bricks.

(iii) *Nature of Demand* : The demand for certain goods, for example, woolen goods,

crackers, water coolers, etc., is seasonal. Industries which produce these goods operate only during that particular season when there is demand for their output.

(iv) *Nature of the Product* : Some goods are perishable and, therefore, should be consumed immediately. Industries producing these goods thus become seasonal, e.g. fruit juices, pickles, etc.

(v) *Availability of Labour* : Sometimes, labour may not be available throughout the year, thereby giving the industry a seasonal image.

1.4.2 Characteristics of Perennial Industry

(i) *Regular Availability of Raw Materials* : Raw materials in the case of perennial industries are available throughout the year e.g. iron-ore, crude oil, wares, furniture, etc.

(ii) *Nature of Demand* : There is large and sustained demand throughout the year for the products of perennial industries. There may, however, be fluctuations in the demand pattern caused by factors like change in tastes and preferences, and price level, but the demand remains the same throughout the year.

(iii) *Permanent Requirement of Labour* : Perennial industries require labour for production throughout the year. Availability of labour makes it possible for these industries to function smoothly.

(iv) *Continual and Uninterrupted Production* : In these industries production goes on unhindered. There may be cases of work stoppages due to breakdowns or strikes/lock-outs, but they are temporary in nature.

Difference between Perennial and Seasonal Industries

<i>Perennial Industries</i>	<i>Seasonal Industries</i>
1. Regular availability of raw material	1. Raw material available at a fixed time only
2. Permanent requirement of labour	2. Labour required at the time of production
3. Continual and uninterrupted production	3. Production only for a fixed period of time
4. Production continues in all seasons	4. Production takes place in a particular season

1.5 Factory and Workshop

When we talk of manufacturing activity, what immediately comes to mind is the process involving transformation of inputs. This manufacturing activity is carried out in units called factories. A factory may be defined as an establishment where manufacturing is carried out with the help of people and machines with or without power, e.g. cement, stainless steel, garments factory, etc. Production in factories may be on a small, medium, or large scale, e.g. handlooms, rubber, and automobile industries. At this stage, it will be of interest to understand the meaning of factory, business units, and workshop.

The factory premises, besides manufacturing, may also house offices, canteens, and distribution centers. Strictly speaking, however, factory activities are to be confined to those which are directly related to manufacturing. Often activities like manufacturing, distribution, future planning, research and developments, etc., take place in the same building or its precincts. In such cases, for understanding a factory, a notional separation of the manufacturing and its component activities is done. All the above set of activities taken together will be known as a business unit. The manufacturing and the activities directly related to it like raw material procurement, storage of goods and raw material,

quality control, etc., will be known as a factory. Thus, strictly speaking, activities like sales, advertising and distribution, research and development, administrative offices, etc. are not part of factory activities. Of course, they do form part of the 'business unit', which is a wider term than 'factory'.

A workshop is a service-oriented activity which is carried out at places where workers work with tools. It has only technically qualified people. It may be organized independently or within the factory e.g. lathe shops, planning units, repair workshops, etc. Many manufacturing processes essentially involve use of workshops, e.g. automobile plants. Others, however, may not require services of workshops e.g. handlooms. Sometimes, a workshop may be run independently, and not as a part of factory, e.g. a car workshop organized to repair cars.

A factory, thus, is a bigger organization. It employs a large number of people and produces more tangible output than an independently run workshop. A factory is the 'genus' of which the workshop is a 'species', except in cases where a workshop is independently run. A factory may have many workshops within it e.g. assembly workshops, boring and drilling workshops, etc. A workshop, like a factory, must be run on permanent premises. This underlines the importance of continuity in the work.

Difference between Factory and Workshop

Factory	Workshop
1. Production-oriented	1. Service-oriented
2. It may have small workshops within it.	2. A workshop may exist within a factory or be run outside the factory.
3. Scale of production is usually on a larger scale.	3. Service is carried out comparatively on a smaller scale.
4. Employs more capital and labour.	4. Employs less capital and labour.
5. Regular production	5. Work may be intermittent or regular.

1.6 Factory under the Factories Act 1948

As we have noted, a factory is an establishment which carries on manufacturing process with the help of men, machines (or tools) and materials. While this is the popular way in which businessmen describe a factory, it has been defined differently under the Factories Act 1948. This Act is the principal Central law in India which regulates the condition of work in factories all over the country. The idea of defining a factory by this law is to decide the scope of the protections provided in it, i.e., who can enforce or demand the facilities talked about in this Act. Also, it helps us to know which employer is obliged to provide facilities to his workmen as provided under the Factories Act.

The Act defines a factory as 'any premises including the precincts thereof

(i) whereon ten or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on with the aid of power, or is ordinarily so carried on, or

(ii) whereon twenty or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on without the aid of power, or is ordinarily so carried on, but does not include a hotel, restaurant or eating-place."

From this definition, we note that a factory is *premises* where a *manufacturing process* is carried on with (i) ten or more workers with the aid of *power* or (ii) twenty or more workers without the aid of power. The Act thus defines a factory with reference to: (i) premises, (ii) manufacturing process, (iii) number of workers, and (iv) use of power. If any of these requirements is not complied with, then the activity cannot be called a factory under the Factories Act.

It will be important for us to know the scope

of this definition. It covers all workers, whether employed directly or through any agency, including a contractor (i.e. contract workers). Also, even if some workers are working without remuneration (i.e. free of charge) they are also treated as workers. The word 'power' is used to mean electrical energy, or any other form of energy, but not generated by human or animal agency. The term 'manufacturing process' has been defined very widely. It is referred to mean any activity which involves making, altering, repairing, packing, treating or adopting any article or substance with a view to its use, sale, delivery, disposal, etc. It also includes activities like pumping oil, water, sewage, transmitting power, repairing ships, storing and preserving any article in cold storage, etc. The use of these terms has made the definition of 'factory' very wide but complex.

From this discussion we understand that the definition of factory as per the Act is narrower than its popular meaning in one respect. That is, in case an establishment does not employ the required number of workers (10 or 20 as the case may be), then it will not be called a factory under the Act even though it satisfies all other elements. On the other hand, it is noticeable that the definition under the Act is much wider in many respects. Under this Act, even if no raw material is used by an establishment in its business, it can still be called a factory. For example, activities such as pumping sewage or water, storing articles in cold storage, transmitting power, repairing ships, etc., are included in the term 'manufacturing process' and the establishments doing such activities can be called factory under the Act if other requirements such as premises, number of workers, etc., are fulfilled.

It should be noted here that, in this book, by the word 'factory' we shall mean an establishment carrying on manufacturing process with the help of men, machines and raw materials. Machines here may be just simple tools. The legal definition

will be used only for understanding the scope of the provisions of the Factories Act, especially in Chapters 6 and 7.

1.7 Characteristics of a Factory

The characteristics of a factory, as commonly understood, and not as per the Factories Act, can be outlined as follows:

(i) *Transformation of Raw Materials into Finished Products* : All factories carry on a production process which is also called manufacturing activity. This involves a change in the raw material thereby making it a product. The transformation adds to the value of inputs. For example, raw cotton through the conversion process is turned into yarn, cotton textiles, and finally, into garments.

(ii) *Use of Raw Materials* : All factories use raw materials for carrying on production activity. The raw material is of the principal input in the transformation process. We may note this with the help of Fig. 1.4.

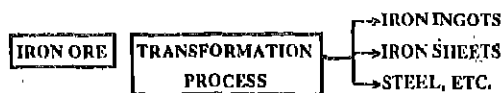


Fig. 1.4 The Transformation Process

(iii) *Use of Machines* : Factories require machines for carrying on manufacturing process. The kind of machines used would depend on the type of transformation involved. A simple process would require just simple tools or less sophisticated machines, while a complex process would involve more advanced machines. For example, automobiles and ship-building industries require more advanced machines while furniture-making involves the use of less complex machines.

(iv) *Use of Power* : Power is increasingly being used in factories. The use of power helps in manufacturing a larger output in shorter time period. With increasing use of modern

technology, there is greater need for power in the manufacturing processes. However, as we noted earlier, factories may produce without power also.

(v) *Division of Labour* : Factories work on the principle of division of labour. Jobs are performed by people who are best suited for the concerned positions. This allows the factories to reap advantages of specialization.

(vi) *Scale of Production* : Factories may be small, medium, or large, depending on the scale of production. A small factory would be working with fewer number of peoples and machines. Also, it would have a limited market e.g. toy factories, book-binding units, etc. A large factory produces large output with more workers and machines e.g. textile units, tobacco industries and tea estates.

(vii) *Professional Management* : Modern factories mostly function on the principles of scientific management. A properly planned out production programme involves less wastage of time and leads to cost efficiency and higher productivity of employees.

(viii) *Legal Regulations* : Factories work within a regulatory framework. They are governed by various laws and a host of other regulations. This means seeking and obtaining approval, registration and various licences under the law. Also, many types of returns are to be filed by factory owners to comply with various laws which regulate them, for example, the laws relating to exercise, customs, income tax, sales tax, labour matters, etc.

1.8 Small and Large Factories

We have noted the meaning of factory, which is a manufacturing unit, with reference to the terms like workers, power, machines and tools. The manufacturing units may be large or small depending on their scales of production e.g. hosiery items may be produced on a small scale while chemical industries, engineering industries, steel mills, etc., are large scale units.

Small factories include all forms of small-scale manufacturing units; traditional and modern enterprises, hand-and-machine-using units of production, and urban and rural industries.

In terms of investments, a small scale undertaking in India is defined as one having an investment in fixed assets in plant and machinery not exceeding Rs 60 lakh. Certain industries manufacture parts, components, sub-assemblies, or tools for other undertakings. These are referred to as ancillary industries. Investment of these units in plant and machinery in order to be classified as small scale units, should not exceed Rs 75 lakh. There are other units which are called 'tiny'. A tiny unit is one in which investment in plant and machinery does not exceed Rs 5 lakh.

Large-scale industries differ from small-scale industries on the basis of scale of operations in terms of output. These units require large capital. Financing of these is usually done through outside agencies also. These industries usually make use of power-driven machines and modern methods of production.

Both small and large-scale industries are required for the economic development of a country. Growth of large-scale industries does not bring about extinction of small-scale industries. In certain circumstances, small industries can out-compete large industries e.g. bricks and tiles, fresh-baked foods, etc.

1.8.1 Characteristics of Small-scale Units

Small-scale factories have the following characteristic features:

(i) *Easy to Establish* : The majority of these units are in the form of sole-proprietorships or partnerships and, therefore, are easy to establish.

(ii) *Limited Coverage of the Market* : Small-scale industries cater to smaller markets. In many cases, their markets may be local only. Their products have small and sometimes short-period demand e.g. preserved fruits, pickles, etc.

(iii) *Small Investment* : Small enterprises have very limited resources. They are generally not able to raise funds from the market, and, therefore, scarcity of capital becomes their major handicap. Since the liability of the owners in case of proprietorships and partnerships is unlimited, their credit worthiness is also small. This restricts them to operate on smaller scale. Thus, their investments are also small.

(iv) *Personalized Management* : There is a personal contact between the owner and the workers. The owner also often works in the capacity of the manager. Thus, the management is not a formal one. The owners also have a close contact with their customers.

(v) *Techniques of Production* : Traditional small-scale industries like khadi and handlooms, handicrafts, etc., use labour-intensive techniques while modern small-scale industries like electronics, etc., are capital-intensive in nature. Compared with large-scale units, however, their techniques of production are less capital-intensive.

(vi) *Use of Local Materials and Skills* : Small-scale units mostly use locally-available resources in terms of raw material and human labour. This reduces the cost of production in terms of transportation, storage, etc., for example, Khurja in Uttar Pradesh is known for its pottery industry, which uses local resources and skills.

(vii) *Flexibility in Operation* : Small-scale units are more flexible in their working. They can adapt themselves to the changing tastes and demands of their customers. As the capital investment is not very high, these changes involve comparatively less business risks.

(viii) *Scope for Individual Creativity* : Owners of small-scale units have greater scope for individual creativity. The management and ownership being the same, a producer is able to carry out new ventures. The risk being small, there is greater scope for exploiting one's potential.

(ix) *Initiation of New Products*: Small industries can initiate new products and can also take care of changing demand. New products are also created for new customers entering the market. Small industries, in their formative stages, can try out their products initially on a small scale. Subsequently, they can organize the output on a larger scale.

(x) *Government Protection*: The Government has created a special place for small-scale industries, which enjoy state patronage in terms of items being reserved for production under this sector. In spite of the recent liberalizations, the small-scale sector enjoys a special position. The State Governments grant cash subsidies and protection, and help them in procuring raw materials and finances. The small-scale industries are also provided with training and marketing facilities.

1.8.2 Characteristics of Large-scale Units

The characteristics of a large-scale unit can be listed as follows:

(i) *Legal Formalities*: Large-scale units have to fulfil certain formalities before they can commence production. These include permission from various authorities for establishing the organization.

(ii) *Wider Market*: Large-scale establishments cater to a bigger and wider market. On account of the size of their operations these units can take account of increase in demand, changes in tastes and preferences, etc. For example, Hindustan Levers, Tatas and other such companies have widely scattered markets.

(iii) *Mass-scale Production*: Large-scale units, because of their resources, can produce on a mass scale. This allows them to reap the advantages of economies of scale of production. This also brings about a reduction in the product cost.

(iv) *Higher Investments*: These units require large investment for commencement and

continuation of production. Thus, their requirements of capital are more than those of the small-scale units. They make greater use of plant and machinery. They also spend on research and development to meet their future growth needs.

(v) *Techniques of Production*: The techniques of production used by these units are capital-intensive in nature. They also require more sophisticated and complex machines.

(vi) *Regulatory Framework*: Large-scale units, when in operation, are subjected to Government regulations, which relate to restrictive practices, closures, retrenchment, lay-offs, foreign exchange, etc.

(vii) *Diversification in Unrelated Products*: On account of the largeness of the size, these units cannot only expand the existing product group but can also branch out unrelated products e.g. the Steel Authority of India Ltd. (SAIL), Birlas, Reliance group and Godrej produce various types of products.

(viii) *Formal Management Structure*: Large-scale industries have a proper hierarchy of management. These unit employ professional managers. They make greater use of modern management techniques.

(ix) *Capacity for Design and Research*: There is a greater scope for research and product designs in a large-scale unit. A separate department for research and development may be created for the purpose for product innovations.

(x) *Presence of Trade Unions*: Trade unions may be present in small-scale units, but their role in smaller units is limited. In the case of large-scale units, the trade unions play an important part. Their activities include collective bargaining, dispute negotiations, labour welfare as well as participation in decision-making.

Thus, we note that the distinctive features of small-scale and large-scale units relate to the number of people employed, capital used, techniques of production, market coverage, total output, etc.

1.8.3 *Difference between Small-scale and Large-scale Units*

As we have noted above, both small-scale and large-scale industries have important roles to play in the economy. These units differ from one another on the basis of the following features:

(i) *Financial Resources* : Large-scale units require more finances. These units, as opposed to small-scale units, raise capital through shares and long-term borrowings or through other financing agencies.

(ii) *Methods of Production* : Both large and small sectors use modern methods of production. But, they differ with respect to the nature of the method employed. Large-scale units, by and large, use complex and advanced techniques of production.

(iii) *Employment of Labour* : Large-scale units employ outside labour on wages while some of the small-scale units like those involved in puppet-making, basket-weaving, etc., employ family labour only.

(iv) *Market* : Large-scale units cater to a

wide and scattered market within and outside the country, while small-scale units sell to comparatively smaller markets.

(v) *Scale of Production* : The volume of output of small industries is much smaller e.g. lock industry, bakeries, etc. Larger houses produce on a large scale e.g. engineering goods industries, textile units, etc.

(vi) *Legal Requirements* : Large-scale units have to comply with legal formalities like obtaining of licences etc. Small-scale industries have relatively simpler rules and procedure for their operations.

From the above analysis, it becomes clear that large-scale and small-scale units differ from each other primarily on the basis of (i) investment, (ii) scale of production, (iii) market, and (iv) methods of production.

Both these units are important for the development and growth of the economy. The industrial set-up has been planned in such a way that large-scale units and small-scale enterprises not only supplement but complement each other.

SUMMARY

1. Nature of Manufacturing Activity

Goods can be both tangible and intangible. They are produced through the manufacturing activity. By manufacturing activity is meant a process which implies a change in the form of raw materials through a conversion process, to produce output. The inputs required for this process are land, labour, capital and enterprise

2. Characteristics of Manufacturing Activity

The characteristics of manufacturing activity are : (i) use of raw materials, (ii) use of tools and machinery, (iii) conversion of raw materials, (iv) scale of operations, and (v) seasonal and perennial activity.

3. Manufacturing, Mining and Agricultural Activities

Production of goods is carried out through primary and secondary activities. The former are connected with extraction, producing and processing of natural resources. Agricultural and mining activities

form a part of this group. *Secondary activities are concerned with materials which have already been produced at the primary stage. Manufacturing activities form a part of this group.*

These activities—manufacturing, mining and agricultural activities—differ from each other on the basis of: (i) raw materials, (ii) scale of operations, (iii) investment, and (iv) use of machines.

4. Seasonal and Perennial Manufacturing Activities

A manufacturing activity may be 'seasonal' or 'perennial' depending on the length of time for which production is carried on. *Seasonal manufacturing activity is one which carries on production only for a part of the year e.g. sugar industry. Perennial industries are those which carry on production throughout the year e.g. automobile industry.* The characteristics of seasonal manufacturing industries are: (i) availability of raw materials, (ii) dependence on climate, (iii) nature of demand, (iv) nature of the product, and (v) availability of labour. Perennial manufacturing industries have the following characteristics: (i) regular availability of raw materials, (ii) nature of demand, (iii) permanent requirement of labour, and (iv) continual and uninterrupted production. *Seasonal and perennial industries differ from one another on the basis of: (i) availability of raw material, (ii) requirement of labour, and (iii) nature of production.*

5. Factory and Workshop

The manufacturing activity is carried out in factories. A factory is an establishment where production is carried out with the help of people and machines, with or without power. Production may be carried out on small, medium or large scale. A workshop includes all places where workers work with tools and it usually has only technically qualified people. *A workshop differs from a factory. The former is mainly service-oriented. It is a smaller organization than a factory. A factory may have many workshops within it.* The characteristics of a factory can be understood with reference to: (i) the number of workers, (ii) use of raw materials, (iii) use of machines, (iv) power, (v) scale of production, (vi) conversion process, (vii) division of labour, (viii) scientific management, and (ix) legal regulation.

6. Small and Large Factories

Manufacturing units may be large or small depending on the scale of production. A small-scale unit is defined as one having an investment of not exceeding Rs 60 lakh in fixed assets. A small-scale industry includes traditional and modern enterprises, hand-and-machine-types of production, and urban and rural establishment. Large industries, on the other hand, require large investment and yield more output. Both large-scale and small-scale units are important for the development and growth of the economy.

Small-scale units have the following characteristics features: (i) easy to establish, (ii) limited coverage of the market, (iii) small investment, (iv) personalized management, (v) techniques of production, (vi) use of local materials and skills, (vii) flexibility in operations, (viii) scope for individual creativity, (ix) initiation of new products, and (x) Government protection.

The characteristics of large-scale units are the following: (i) legal formalities, (ii) wide markets, (iii) mass-scale production, (iv) higher investments, (v) techniques of production, (vi) regulatory framework, (vii) diversification in unrelated products, (viii) formal management structure, (ix) capacity for design and research, and (x) presence of trade unions.

Large-scale and small-scale units differ from each other on the basis of: (i) finance, (ii) methods of production, (iii) employment of labour, (iv) market, (v) scale of production, and (vi) legal requirements.

EXERCISES

I. Objective-type Questions

Indicate which of the following statements are right and which are wrong.

1. Manufacturing activity involves a change in the form of raw materials.
2. Mining activity does not involve a change in form.
3. Perennial industry does not require regular availability of raw materials.
4. Workshop includes all places where workers work with service-orientation tools.
5. The Factories Act, 1948, defines a factory only on the basis of the use of power.

II. Short-Answer-type Questions

1. Explain the meaning of 'manufacturing activity'.
2. Distinguish between 'seasonal' and 'perennial' industries.
3. What do you understand by a 'workshop'.
4. Define a factory as per the Factories Act, 1948.
5. What is a small-scale factory?
6. Explain the term 'manufacturing process'.

III. Essay-type Questions

1. Explain the characteristics of small-scale units.
2. Distinguish between manufacturing and agricultural activities.
3. Explain giving examples how a 'workshop' is different from a 'factory'.
4. Distinguish between small-scale and large-scale units.
5. Explain the characteristics of large-scale units.
6. Explain the term 'factory' as defined in the Factories Act, 1948.
7. Explain the key features of small-scale units.

CHAPTER 2

Setting up a Small-scale Unit

LEARNING OBJECTIVES

After reading this chapter, you should be able to —

- list the factors to be considered for setting up a small-scale unit;
- examine the nature of product selection and factors involved in it;
- explain the importance of raw materials and essential services in setting up a factory;
- explain the estimation of capital and factors affecting the fixed and the working capital requirements;
- explain the factors to be considered for the location of a factory;
- list the considerations in site selection;
- explain the importance of and procedure for procuring machinery and equipment;
- recognize local laws and permissions from local authorities;
- state the procedure for registration of a factory under the Factories Act, and the Shops and Establishments law; and
- state the licensing requirement for setting up a large or small-scale factory.

2.1 Introduction

In the first chapter, we have noted the points of difference between small and large industries. They arise largely because of the distinct organisational character of the former, which is indicated by many factors. Some of these factors are ownership, management, techniques of production, flow of input/output, and localization.

Small-scale industries play a crucial role in the economic development of a country. They

are of special importance in India because of the inherent advantages they enjoy. They provide large-scale employment because these are mostly labour-intensive in character. Their location can be easily decentralized in the semi-urban and rural areas. The small-scale sector helps to utilize local resources and skills which might otherwise remain unutilized. This sector earns valuable foreign exchange through the exports of its products. Small-scale industries help in reducing

concentration of economic power in a few hands, since they help in promoting more widespread and equitable distribution of national income and wealth.

During the Seventh Five Year Plan period the share of small-scale sector in the gross value of output of the entire manufacturing sector is estimated to be about 35 per cent. About 119 lakh people are estimated to have been provided with employment by this sector. Also, 28 per cent of the total value of exports was from small-scale industries. This achievement has been possible due to the favourable attitude of the Government towards this sector. Any prospective entrepreneur, therefore, should first know the framework of these protections, as also the procedure, permissions and considerations involved in setting up small-scale industries.

2.2 Deciding to Set Up a Small-scale Unit

The massive expansion of the small-scale sector has led to the growth of an energetic class of small entrepreneurs. They may go in for this sector because of their specially acquired skills or the opportunities available to them. Once a decision is taken to own or set up a small-scale unit, an entrepreneur needs to acquire adequate knowledge to organize and operate it.

The success of a small-scale industry depends, to a great extent on careful planning and its efficient execution. Planning involves consideration of various factors so as to ensure a fair rate of return on the investment. Each of these factors has to be given due weightage. These factors are the following:

- (i) Selection of the product.
- (ii) Availability of raw materials and essential services.
- (iii) Estimation and arrangement of the capital.
- (iv) Location of the plant.
- (v) Procurement of machinery and equipment.

(vi) Recognizing statutory licences and local laws.

(vii) Registration with the authorities.

Each of these points is discussed in details in the sections that follow.

2.3 Selection of the Product

All production involves a project of some sort. It may be presented as a completely documented project or as a new idea, which must be translated into a manufactured product. More simply put, a product is anything which is the result of someone's effort. Since the success of a factory primarily depends upon the product, it is essential that the selection of the product is done very carefully. It should preferably have no or little competition. The idea should be new and it should meet the modern requirements of the society.

In the process of the product selection an entrepreneur may consider the following factors:

(i) *Personal Background of the Entrepreneur* : It consists of the entrepreneur's educational qualifications and technical training undertaken, pre-ownership experience, family background, and his aptitude towards the specific business.

(ii) *Marketability of the Product* : Before selecting a project an entrepreneur is required to find answers to four basic questions: (a) What is the potential market? (b) What is the state of the existing competition? (c) What will be the effect on the existing products? and (d) Is there a substantial market either available or capable of being created?

(iii) *Availability of Technology/Manufacturing Process Details* : The nature of technology or manufacturing process available also helps in product selection. Appropriate selection of technology will lead to cost reduction, less rejections, and quality improvement. The employer should ensure easy availability of plant and equipment. Most of the machinery should

preferably be available indigenously. Any import requires formalities which are both cumbersome and time-consuming. Also, the imported machinery could be more expensive and thus might upset the budget of the entrepreneur.

(iv) *Level of Investment Required* : An entrepreneur needs to examine the total investment required to set up a small-scale unit. Estimation of the amount of money he can invest is essential. The capital investment intended to be made for establishing an industrial unit depends mainly upon the individual capacity to invest in a specific product line. About 10 to 20 per cent of the total cost of a project has usually to be provided by the entrepreneur himself. If, for example, your project is expected to cost Rs 15 lakh, you will need to provide original investment of about 3 lakh from your personal sources.

(v) *Availability of Raw Materials and Other Inputs* : Ready and easy availability of raw materials and local resources leads to greater productivity. This becomes possible due to a greater assurance of a stable, economic and continual supply of such inputs. One should take a close look at the economics of raw material requirement. Certain products are to be discouraged so as to avoid, at a later stage, the problems involved in the availability of adequate raw materials.

(vi) *Reasonable Profit Margin* : Before selecting a product the entrepreneur needs to know the profitability, percentage of profit obtainable on the sales value, as also the profit on the total investment made by him. Reasonable profit margin may vary from 20 to 40 per cent for small-scale enterprises.

2.3.1 Items Reserved for Small-scale Industries

Small-scale industries are nurseries for developing entrepreneurs. The Government of India has introduced a wide range of policies and programmes to support the development of the small-scale sector. For this, an extensive

institutional-support network has been created, which provides the small-scale industries with finance and marketing assistance, tax concessions, skill formation and training, liberal import facilities infrastructural support, increased availability of raw materials and upgradation of technology. The Government also pursued a policy to give protection and purchase preferences to this sector.

The Government of India has reserved 836 items to be exclusively manufactured in the small sector. Also, under the Government's Stores Purchase Programme, i.e., purchases made by the Railways/Defence, etc., 409 items have been reserved for exclusive purchase from the small-scale sector.

It is, therefore, advisable to first have a look at the list of reserved products and see if they are in consonance with requirement of the entrepreneur. After you make a list of products you have in mind you may approach the Small Industries Service Institute (SISI), which is located at the State headquarters. They have project profiles on all reserved items, which are available at a nominal cost. These profiles give basic information on product manufacturing, investment, raw materials, machinery needed and its various sources, etc.

2.4 Availability of Raw Materials and Essential Services

Development of a small-scale enterprise depends, to a great extent, upon the availability of infrastructure of facilities in the area concerned. Infrastructural facilities in industry generally imply the availability of raw materials, fuel, power, water, transport and banking facilities. We may discuss these facilities as follows:

(i) *Availability of Raw Materials* : Every small-scale industry requires different varieties of raw materials. Some of these are available from indigenous sources while the rest have to be imported. Out of those indigenously available,

some run into short supply from time to time. Measures are taken by the Government to remedy the situation to ensure a smooth and equitable distribution of these resources.

Availability of raw materials in required quantity at a reasonable price is an important location decision to be considered by the entrepreneur. The degree of influence which the raw material exerts on location decisions depends on the proportion of material cost to the total cost of the product. A small-scale unit is normally located near the areas where an abundant supply of the raw materials is available locally. A new entrepreneur should ensure timely flow of raw materials in anticipation of actual requirement.

Bulky and heavy raw materials that lose much of their weight or volume in the manufacturing process are powerful forces affecting location. A sawmill is an example of a plant which must stay close to its raw materials in order to operate economically. The cost of transporting these raw materials from the sources of supply to the place of manufacture is more than the cost of transporting the finished products from the factory to the market. A location near the main suppliers will help reduce cost also, it will permit the staff to readily visit suppliers to discuss technical and delivery problems. Non-weight-losing material do not lose their weight in the process of manufacture. Instead, they grow in weight when they are converted into finished products. The cost of transporting the finished product in such cases, therefore, is more than the cost of transporting the raw materials. Examples of non-weight-losing materials are cotton, wool, etc. These materials exert little influence on plant location.

(ii) *Adequate Supply of Fuel, Power, and Water* : Fuel, power, and water are important inputs of production. The entire movement of the machinery depends upon them. If, for example, there is a short supply of fuel such as coal, cokes, oil and electricity, there is an

interruption in the production flow and the entrepreneur has to suffer heavy losses. Therefore, the availability of power, fuel and water is an important requirement for the development of industries in any area. One needs to study the existing position as well as the future prospects with regard to such services in the area under consideration.

Normally, electricity can be obtained anywhere, but there are some industries which consume exceptionally large amounts of power. In such cases, the proximity to the sources of cheap power and fuel is of paramount importance. An entrepreneur may also examine the ratio of electricity presently being consumed in that area to the installed capacity, cuts imposed in electrical load in any particular seasons, and the cost per unit of electricity consumed.

On the other hand, there may be certain industries requiring considerable quantities of water. Food preparation, breweries are such examples. An entrepreneur producing such products needs to study the dependability on the supply of water, surplus quantity available, and the cost per unit of water consumed at the site.

(iii) *Transport Services* : Various transport services provide an essential link between the production centres, distribution areas, and the consumers. Transport services are mainly required for three reasons : (a) Raw materials are to be moved to the factory site. (b) Finished products are to be dispatched from the factory to the market. (c) Employees are to be transported to and from the factory. Goods are seldom sold within the area where they are gathered or produced. There will always be movement of goods and commodities when they are to be sold. This requires arrangement of transport, sometimes for long distances. The cost of this makes up a substantial part of the cost of goods to the consumer and will include wages, petrol and oil, depreciation of the value of vehicles in use and insurance cover against various risks.

Certain factors require consideration before a decision is made on the mode of transportation to be used. These are : (a) distance from potential customers, (b) nature of goods to be carried, i.e., weight, volume, fragility, packaging, and regularity of the consignment to be made, (c) availability of storage, servicing, and loading facilities, (d) distance from airports, seaports, and railheads, (e) the degree of urgency of deliveries, and (f) availability of funds.

Every manufacturer aims at achieving maximum utilization of the available means of transport. He should also ensure the availability of dependable, prompt and cheap mode of transport. The above-mentioned factors are helpful in taking these decisions.

(v) *Banking Facilities* : No worthwhile economic activity is ever conceivable without the appropriate arrangement of the required finance. One of the major constraints in the growth of small-scale units has been the difficulty of finance. It is for this reason that they should be set up where there is an adequate network of institutional finance.

Small-scale industries require long-term funds to acquire fixed assets like building, machinery, equipment, etc. Long-term funds are needed to finance working capital, which is required to hold stocks of raw materials, and finished goods, and to meet the day-to-day requirements of running an enterprise. To meet their financial needs, entrepreneurs have to depend upon two sources of finance: (a) internal source, and (b) external source.

Internal sources of finance of a small-scale industry mainly consists of its own savings and retained earnings. External sources of financing consist mainly of borrowings from commercial banks. Banks provide both long and short-term funds to entrepreneurs to carry on their business operations. The facilities offered by banks to small-scale units for meeting the working capital requirements are granting of loans, bills

discounting, and overdrafts. They also meet fixed capital requirements against the security of assets. The banker is usually the first outside source which the small-scale units can utilize, when seeking to borrow funds. It is important that rapport with banks be established and maintained to ensure continual financial support from them. If the bank cannot provide funds, it should be able to help the entrepreneur locate them from other sources. The importance of a good banking relationship cannot, therefore, be over-emphasized.

2.5 Estimation and Arrangement of Capital

As we all know, finance is an important factor in the running of an enterprise. It is required to bring a business into existence. It is essential for both promotion and growth, i.e., bringing the concept to life and seeing it grow. It is also needed to comply with a number of legal formalities that are to be completed before a business can be brought into existence. Therefore, a business unit has to provide funds for its various requirements.

Thus, a business enterprise requires capital for investment (i) on fixed assets, (ii) for day-to-day working, and (iii) for the development and growth of the enterprise. This requires a careful financial planning, which involves determination of the total amount of capital needed for the functions mentioned above, and effective utilization of these funds. These funds are required in the form of either (a) fixed capital or, (b) working capital.

2.5.1 Fixed Capital

Fixed capital is required to meet the long-term capital needs. This may be needed, for example, for the purchase of plant, machinery, furniture, replacement of old fixed assets, etc. It is not always essential for the fixed capital to be equal to the amount of fixed assets. Working capital may also be used in purchasing some fixed assets.

The total amount of fixed capital required differs from enterprise to enterprise.

Factors affecting Fixed Capital: The factors which affect the requirement of fixed capital in an industry are the following :

(i) *Size of the Business Firm* : A large-sized unit requires more fixed capital than a small-sized firm.

(ii) *Nature of Business* : The nature of business is an important determinant of the total fixed capital. For example, a manufacturing industry like iron and steel would require more fixed capital than a company which may be a trading unit.

(iii) *Type of Production Process Used* : A manufacturing unit which is capital-intensive in nature would require greater investment in plant and machinery, etc. On the other hand, a unit which uses labour-intensive techniques of production would require less investment in fixed capital.

Fixed capital can be raised through long-term sources. The sources can be enumerated as (i) shares, (ii) debentures, (iii) loans, (iv) public deposits, and (v) retained earnings.

2.5.2 Working Capital

Working capital is required for the day-to-day functioning of a business unit. It is also known as "current capital". It is required for (i) keeping the stocks of raw materials and finished and semi-finished goods, (ii) payments of salary and wages, (iii) meeting requirements like office and factory expenses, rent, insurance, etc., (iv) meeting expenses on advertisements, sales promotion, etc.

Working capital can be (i) permanent or regular working capital, and (ii) temporary or variable working capital. The former is that part of working capital which the firm must hold to continue in business operations. These funds are sunk in this going concern. Normally, long-term sources are used for financing permanent working capital.

Temporary or variable working capital refers to the amount of funds required to meet the seasonal or temporary requirements of an enterprise, e.g. funds needed to meet the additional orders received at a point of time.

Working capital can be (i) gross working capital, and (ii) net working capital. The former refers to investment in current assets. Current assets are those which can be converted into cash within an accounting year and include cash, short-term securities, bills receivables, debtors, and stocks. Net working capital is defined as the difference between a firm's current assets and current liabilities. The latter are claims of outsiders expected to mature for payment within an accounting year. They include creditors, bills payable, bank overdrafts, and outstanding expenses.

The net working capital reflects a firm's financial position. It shows the firm's ability in meeting the current obligations. Net working capital must be positive.

2.5.3 Determinants of Working Capital

The working capital requirements of an enterprise are influenced by the following factors.

(i) *Nature of Business* : The nature of the business unit refers to the kind of products manufactured and other allied matters. These have close linkage with the need for possessing current assets. For example, a company engaged in commercial activity requires large working capital.

(ii) *Size of Business* : The scale of operations is also a very important factor in determining the amount of working capital. A manufacturing unit with a large scale of operations would need more capital than a small company.

(iii) *Manufacturing Process* : The manufacturing process of a company also determines its working capital needs. A complex manufacturing process has a longer process time. The longer the process, the larger is the investment in inven-

Components of Working Capital

Current Assets	Current Liabilities
Inventories	Bank Borrowings
(i) Raw materials	(i) Credits and over drafts
(ii) Work-in-progress	(ii) Bank loans
(iii) Finished goods, stores and spares	
Sundry debtors	Sundry creditors
Other Current Assets	Other Current Liabilities
(i) Cash and bank balances, other loans and advances.	(i) Advances from customers
(ii) Prepaid expenses (rent, insurance, etc.)	(ii) Accrued expenses like salaries, wages and other trade dues
(iii) Short-term investments in government and semi-government loans	(iii) Electricity charges payable
(iv) Payment of advances taxes	(iv) Municipal rent payable
	(v) Provision for income tax, dividend

ories and, therefore, higher working capital needs.

(iv) *Production Policy* : The production policy of the business unit also affects the working capital needs. For example, seasonal industries have different types of working capital problems. Their requirements differ from season to season, e.g. sugar industry. Where production is seasonal, large working capital is required. Conversely, in industries where the level of demand is consistent throughout the year, the working capital requirement will be smaller comparatively.

(v) *Speed of Turnover* : The speed with which the circulating capital is converted from cash into raw materials, work in process into finished goods and sales into cash would also influence the working capital needs. If the turnover is speedier, the requirements of working capital are smaller.

(vi) *Terms of Business Deal* : The terms of business deal play an important part in the determination of working capital needs. For example, the purchase of raw materials on cash and the sale of goods on credit involves a large amount of working capital, and vice versa.

(vii) *Techniques of Production* : All industries using labour-intensive techniques would

require larger working capital than those using capital-intensive techniques.

(viii) *Raw Material in Relation to Total Costs* : The cost of raw material in relation to total costs also affects the working capital needs. If the raw material cost accounts for a very high proportion of the total cost of production, the working capital requirement of that industry would be larger.

(ix) *Total Cash Requirements* : Some business units require comparatively larger amount of cash to meet their operating expenses. Such units require greater amount of working capital.

(x) *Growth and Expansion* : The expansion and growth programme of a business unit requires larger amount of working capital.

(xi) *Business Cycles* : The business cycles, which involve booms, recession, depression and recovery also influence the working capital needs. For example, boom conditions require larger amount of working capital, while during the periods of recession the working capital needs are much smaller.

(xii) *Dividend Policy* : The dividend policy of a business unit is an important factor in determining its working capital needs. Since

dividends are paid in cash, a company cannot afford to ignore their impact on cash needs.

(xiii) *Banking Facilities* : The availability of banking facilities also affects the working capital needs of an enterprise.

(xiv) *Miscellaneous Factors*

(a) *Promotional Errors* : Errors in the promotion of a company also affect the working capital needs e.g. the capacity of the business unit may be overrated and thus it would influence the working capital requirements.

(b) *Backward Area Location* : The location of a unit in a backward area involves high costs, therefore, would affect the working capital needs.

(c) *Price Level Changes* : Price level changes in the economy also affect the working capital needs. An increase in price level means that a larger amount of capital is required than before.

2.6 Location of the Enterprise

One of the most complex and important decisions to be taken by an entrepreneur while evaluating his project is the selection of its best location. It is not the frequency but the lasting effects of the location decision that make them so important. Location is of great importance because: (i) it influences some of the physical factors of an overall plant design, and (ii) it determines investment cost and the level of many operating costs. An ideal location may not, by itself, guarantee success, but it certainly contributes to the smooth and efficient working of an organization.

It is useful to differentiate between 'location' and 'site'. The 'location' is the general area, and 'site' is the place chosen within the location. The decision on siting thus proceeds in two stages: (i) choice of location, and (ii) selection of site. We may discuss these in detail.

2.6.1 Choice of Location

Location of geographical distribution of industries in a country is determined by a number of

complex considerations. The choice of location is the result of weighting the relative significance of these factors. Major factors to be considered for the location of a factory area are as follows.

(i) *Availability of Raw Materials* : In the earlier part of this paper, we have discussed how availability of raw material exerts influence on location decision. Nearness to raw materials offers three basic advantages: (i) it reduces cost of transportation, (ii) ensure regular and uninterrupted supply of materials since there is no dependency on transportation, and (iii) it saves cost of storage of materials. The entrepreneur engaged in manufacturing activity should locate his factory where the supply of raw materials is assured at the minimum transport cost.

(ii) *Easy Access to Markets* : Since goods are produced for sale, it is very essential that the factory should be located near the market. Usually, industries using pure or non-weight-losing raw materials, enterprises producing perishables or bulky products, or servicing units tend to be located near the market. Auto-servicing and repairing units, pesticide manufacturing units, or hosiery units are some examples of industries located near their markets. Proximity to market is more important to the units manufacturing consumer goods rather than to those producing capital goods.

There are several advantages enjoyed by an entrepreneur if he sets up his factory near the market. These are: (i) reduction in the cost of transporting finished goods to the market, (ii) ability to adjust the production programme according to the changing attitude and habits of the customer, (iii) ability to render prompt services to the customers, (iv) provisions of efficient after sale services, and (v) execution of replacement orders without delay. Location near a market centre is clearly desirable if other factors are approximately equal. In particular, this is true of industries in which the cost of transporting the finished product is high relative to its value.

(iii) *Availability of Labour* : It is an important factor in the production of goods. An adequacy of labour supply at reasonable wages is very essential for the smooth and successful working of an organization. A manufacturer's labour requirement depends upon the nature of the production process. The labour required may be skilled or unskilled. It is the skilled labour which influences plant location because unskilled labour is supposed to be available everywhere, especially in our country. The location of the hosiery industry in Ludhiana, the shoe industry in Agra, the lock industry in Aligarh are examples of industries which are located near the supply centres of the skilled labour. However, now-a-days the influence of skilled labour on plant location has lost some of its significance because labour has become mobile. But wage rates are particularly more important for factories if they have a high percentage of labour cost.

(iv) *Personal Factors* : Sometimes, a prospective entrepreneur considers only the home town for location, disregarding economic considerations. Whatever the reason for one's own preference, it is an important factor in locating one's business.

(v) *Existence of Complementary and Competing Industries* : The existence of local competition is favourable to the location of industries. The unit can in collaboration with similar units, secure materials on better terms than it can by itself. It will attract labour market, banks and a variety of complementary units. So long as there is healthy competition between competing firms, real benefits will flow.

2.6.2 Selection of Site

Once we have chosen a location for the factory, the next question that must be tackled is "which out of number of sites shall be chosen". It is dangerous to undertake site selection before the best city has been found. If the city is properly chosen, suitable site in terms of street, building,

areas should be found. In housing a specific site, the most important aspect may be either (i) the cost factor or (ii) the degree of customer accessibility. The nature of business determines which of these considerations has greater priority.

Cost Factor : There are firms that stress the costs associated with the site, i.e., purchase costs and operating costs on that particular site. A site is most favourable when it enables delivery of the product and service to the customer at the lowest cost. This means minimum operating costs, i.e., labour, rent, power, heat and other utilities. There are, sometimes, businesses where the customers do not come to the business establishment. It would be unwise for such firms to pay rent for location in central business districts. Instead, their concern is with production efficiency and relative costs associated with the site. Some of the vital questions that the entrepreneur needs to answer before site selection are:

- (a) Is the site properly zoned for industrial use?
- (b) How does the purchase price and rent on the property compare with that of other available sites?
- (c) Will the foundation soil stand the weight, vibration, and other physical features of business operations?
- (d) Does the existing transport system make the site reasonably accessible to employee?
- (e) Is there ample space for future expansion, parking space, extra space for trucks to be loaded or unloaded?
- (f) Are water, electrical, sewer and other connections already installed, and are they adequate?
- (g) Are property taxes in line with those of other sites?

Degree of Customer Accessibility : Some business sites must be chosen to attract customers. This does not mean that the cost factors

discussed above can be disregarded but it does mean that the first and foremost consideration is customer accessibility. The first step, then, in choosing a site is to analyse the type of product or service, the value of the market, customer's buying habits, and the effect of those factors upon prospective sites. Some food stores, for example, would choose a site close to the residential areas.

Optimum Site Selection

If an entrepreneur comes across more than one site, the selection of an optimum site becomes desirable. A tremendous amount of information needs to be obtained. The optimum site is selected on the basis of a comparative economic survey of the alternative sites in question. The survey should begin with the determination of the volume of sales and income promised by the alternative sites. Then, the cost of getting raw materials and converting them into finished products may be estimated for all the sites in question. This will give an idea of the optimum location where the cost of production is the least and the profit is the highest.

Industrial Estates

An entrepreneur may decide to locate his enterprise in an industrial estate. What most people understand by an industrial estate is a group of factories constructed. Strictly speaking, it is an important institutional arrangement where necessary infrastructure is set up for orderly growth of industrial units in a specified area. Industrial estates have facilities of water, transport, electricity, waste disposal, banks, post offices, canteen, first aid, etc. Special arrangements for technical guidance and common service facilities are provided at these estates. The principal objective of the Government of India in setting up these estates was to relieve congestion and overcrowding in large cities. Its policy has stimulated industrial expansion in less

developed regions. This has also created the necessary climate for the development of small-scale industries. They have also been used as the medium for dispersing industries to rural and under-developed areas. These estates have provided a phase of operation for many young and dynamic entrepreneurs of our country. The industrial estate system helps to clear and prevent industrial slums. It also promotes ancillary industries.

The best choice of land for industry is a shed located in an industrial estate. The State Governments provide several facilities at these estates, such as subsidy on rent for factory accommodation, allotment of sheds on hire-purchase basis, outright sale of sheds, reasonable charges for water and electricity, exemption of sales tax on certain categories of industries for a given period of time, etc.

2.7 Procurement of Machinery and Equipment

The entrepreneur should have a clear idea of the different types of machinery and equipment. Machines in the factory may be of general purpose or special purpose in character. General purpose machines for metal-works include lathe, drill, presses and milling machines. In a wood-works plant, general purpose machines include rip saws, planing mills and lathes. The general purpose equipment requires comparatively lower investment. It can be used for a varied type of operations.

A special purpose machine is a machine or equipment used for doing specific work. The bottling machine in a soft drink bottling plant or the milking machine in a dairy both are instances of special purpose equipment used by small firms. The initial cost of such equipment is much higher.

The purchase of any piece of equipment, whether it be plant, tool or production-aid, can be justified only on economic grounds, i.e., whether the cost of the new equipment can be

recovered from the selling price of the goods made or the services offered. The final choice of machine and equipment to be used is dependent upon (i) What is available or what can be made? and (ii) What is economically reasonable? The design of the process, the quality of its output and its operational efficiency will affect the amount of investment capital that can be attracted.

After assessing the requirement, the entrepreneur has to prepare a list of suppliers together with the price list. Before placing the order, the following are to be considered:

- (i) Capacity of the proposed unit.
- (ii) Quality of its output.
- (iii) Performance standards expected.
- (iv) Minimum economic scale of production.
- (v) Minimization of wastage.
- (vi) Availability of spare parts for the new machinery.

2.7.1 Procedure for Procuring Machinery and Equipment

Procurement of machinery and equipment can be done through either outright purchase of these items or through hire-purchase. Buying machines on hire-purchase enables the purchaser to take possession of the items and enjoy their use while the vendor continues to own them until full payment has been made.

The National Small Industries Corporation Ltd. (NSIC) supplies indigenous and imported machinery to small-scale units on hire-purchase basis. The rate of earnest money to be paid varies from 15 to 30 per cent. Service charges may vary from 2 to 5 per cent depending on the value of machinery. The full hire-purchase value is payable in 13 instalments. In certain cases like furnaces, cold storage, electroplating, boilers, etc., the value is payable in nine instalments.

Concessional rate of earnest money, interest, and service charges are payable by units set up by technocrats the Scheduled Caste/Scheduled Tribe entrepreneurs, physically handicapped

persons, and the defence personnel. Applications on the prescribed form is to be sent to the NSIC or its branch at the state district level through the Deputy Director/Regional/Joint Director of Industries or through the respective District Industries Centre (for units situated in districts). The application is to be accompanied by the latest quotations from the manufacturers/suppliers of machinery approved by the NSIC. If the entrepreneur is in a position to purchase the machinery outright from a reputed dealer, he may place an order for the machinery. He may do so after satisfying himself that it is of the latest model and conforms to his expectations.

Reputed small-scale units or entrepreneurs of proven ability can also get machinery on lease basis from leasing companies on terms agreed to mutually by the parties concerned. The National Small Industries Corporation also supplies machinery to the existing profit-making, financially viable small-scale units (with permanent registration as an SSI unit) on easy leasing terms.

2.8 Statutory Licences and Local Laws

All small-scale industries require permission from competent authorities so as to comply with various legal regulations. An entrepreneur seeks approval for specific regulations on the basis of (i) the product line chosen, (ii) the size of the unit, (iii) the number of workers employed, and (iv) the type of process used, etc.

The Development Commissioner, Small-scale Industries, has listed the various authorities which are competent to issue licences. These are stated in the table.

Industries which involve the use of water, acid alkalis, chemicals and heat treatment resulting in discharge causing pollution problems have to obtain clearance from the Health Department.

Industries manufacturing explosive, fire-works, safety matches, sulphur, etc., require

Authority Competent to Issue Licences

<i>Product line/Activity/Service</i>	<i>Licensing Authority</i>
1. Units employing 10 or more workers with power, or 20 or more workers without power—Approval under the Factories Act	Chief Inspector of Factories
2. Manufacture of drugs and cosmetics	State Drug Controller/Drug Control Administration
3. Manufacture of fruits and vegetable based products—Licence under Fruit Products Order	Deputy Director, Food and Vegetables Preservation, Ministry of Agriculture, Government of India, located in States
4. Industries using water and involving effluent disposal/gaseous waste, etc.	To get clearness from (i) The District Health Officer of the particular district and (ii) Director of Public Health of the State Government
5. Power connection	Officer designated by the State Electricity Board concerned
6. SSI approval of electronic items governed under the decentralized category	State-level Technical Committee under the State Directorate of Industries
7. SSI approval of electronic items other than decentralized items	Development Commissioner, Small Scale Industries, New Delhi, through State Directorate of Industries
8. For units functioning in places other than Industrial estates/approved developed plots	Licence from Commissioner Corporation or Municipality or Panchayat or State
9. Pollution Control	State Pollution Control Board
10. Registration under the State Sales Tax Act	Local Joint Commercial Tax Officer
11. Registration under Central Excise Act	Superintendent of Central Excise of the area or Collector of Central Excise
12. Payment of Income Tax	Assistant Commissioner or I.T.O.
13. Registration of Partnership Deed	Jurisdiction of the Area Inspector General or Registrar of the area.

clearance from the Fire Service Department. Units manufacturing/ handling hazardous chemicals and inflammable solvents are required to obtain licence or permission for the storage of these chemicals from the concerned State authorities. Caustic soda, and petrochemicals, etc., are examples of such industries. Industries which bring along with them a number of environmental problems, require clearance from the State Pollution Control Board. Rubber goods, carpet weaving, electroplating, are a few examples of these industries.

2.9 Registration of Small-scale Units

Registration of small Industries with the concerned State Directorate of Industries is voluntary. However, in order to obtain the

required assistance, facilities and concessions from the government, the small-scale enterprises are advised to get these units registered with the Directorate of Industries of the State in which these units are located.

The registration of a small-scale unit is done in two stages:

- (i) provisional registration, and (ii) permanent registration.

Provisional registration enables the unit to apply for and obtain facilities such as allotment of factory sheds or plots in industrial estates, water and power connection, liberalized financial assistance, machinery on hire-purchase from Central/State Government organization etc. Like in the case of the National Small Industries Corporation (NSIC) and the State Industrial

Corporation (SSIC) the provisional registration is granted at the level of the District Industries Centre within a period of seven days after the receipt of the application. After the unit has taken all steps to commence production, it can apply for permanent registration.

New entrepreneurs desirous of setting up small-scale units in different districts should apply for registration. The application on prescribed form is made to the General Manager of the District Industries Centre functioning in the respective districts.

2.10 Registration of Factory under the Factories Act 1948

Registration of a factory under the Factories Act 1948 is statutory. The Director of Factories and Buildings inspects the factory and issues licence. Under the statute there are three formalities that are to be complied with: (i) approval of the factory building, (ii) registration of the factory under the Factories Act, and (iii) annual renewal licence.

The Chief Inspector of Factories first approves the plans and then permits the construction of the building. Various documents to be submitted for this purpose are: (i) application form, (ii) site plan, (iii) detailed building plans, (iv) a flow chart of the manufacturing process, and (v) a certificate of approval of the location of the factory from the Chief Town Planner.

Once the building is constructed, an application should be submitted to the Chief Inspector of Factories of the concerned State for the purpose of registration and grant of licence, 15 days in advance from the date of occupation. The application for registration and occupation are to be submitted in triplicate. The application-cum-notice usually contains the name and location of the factory; name and address of the owner, occupier and manager of the factory; nature of the manufacturing process; total rated horse power installed, number of workers likely

to be employed, etc. The licence granted is valid up to 31st December of the year in which it is issued. A factory licence granted by the Chief Inspector of Factories should be renewed every year.

Whenever a new manager is appointed, the occupier of the factory is required to send to the Inspector a written notice. A copy of this notice is also to be sent to the Chief Inspector. This notice is to be sent within seven days from the date on which such a person assumes charge.

2.11 Registration under the Shops and Establishment Act

We noted earlier that, as per the Factories Act 1948, a factory employs 10 or more persons in the manufacturing process carried on with power or 20 or more persons without power. Now, the question arises: What is the status of a manufacturing unit which employs less than the number of persons as mentioned in the definition of factory? These units are called 'establishments' and are governed by the Shops and Establishment Act passed by virtually each of the State Governments. Unlike the Factories Act, which is a Central law, there is no Central law with respect to shops and establishments. The Shops and Establishment Act is administered by the concerned State Governments in their respective territories. Each State Government has framed its own rules under this Act for carrying out its objectives. The Act, among others, applies to all factories and clerical departments of a factory not covered by the Factories Act 1948.

In all States, except Assam, this Act provides for registration of all shops and establishments on a compulsory basis. The registration is to be applied for on the prescribed form to the Chief Inspector or the Area Inspector appointed under this law. The application should be made within 30 days from the date of commencement of the work of the establishment. The necessary fees have to be paid with the application form. In the

application form the employer has to send a statement which should contain such particulars as the name of the employer and manager; nature of business; name, category and address of the establishment; number of employees, and other required particulars.

The authority, on being satisfied about the application, issues a registration certificate, which is valid for one year or for a specified period. The registration certificate should be prominently exhibited at the premises of the establishment. Any change in the particulars supplied at the time of registration should be communicated to the Chief Inspector. The closure of the establishment is also to be intimated.

2.12 Setting up of a Large-scale Factory

The setting up of a large-scale factory involves a large amount of investment and is a complex industrial activity. It is, therefore, essential to understand several aspects of the industrial policy and licensing which regulates the setting up of large- and medium-sized industrial undertakings. The Industrial Policy of a country provides a framework which determines the nature of participation by entrepreneurs in industrial activity. It clearly defines the sphere and scope of private and public sector enterprises. It spells out the choice of technology and the scale of production in different industries. It also includes a whole range of financial and fiscal policy. In India, an Industrial Policy Resolution (IPR) was first adopted in 1948. Important developments had taken place since then, which necessitated the formulation of the IPR of 1956. Later, several modifications were introduced in it from time to time. The latest changes were announced in the form of the Industrial Policy Statement, 1991.

An industrial licence is an important instrument of industrial policy of the states. It is a written permission from the Government to an industrial unit to manufacture goods specified in the permission letter. The industrial licensing in

India was adopted in 1948 and it was later made a law in the form of Industrial Development and Regulation Act (IDRA) in 1951. The principal objective of IDRA was to enable the Government to implement its industrial policy. The Act, as amended, consists of, among others, the First Schedule which lists the various industries for which compulsory licensing is required.

A licence is required to be obtained from the Central Government in the following cases:

- (i) Establishing a new industrial undertaking which is covered by the First Schedule.
- (ii) Producing or manufacturing a new article by the existing units if the article is subject to compulsory licensing.
- (iii) Expansion of an existing unit.

Relaxation of licensing requirements for substantial expansion has been made from time to time, when the Government decided to liberalize the licensing system. The Central Government is empowered under the IDRA to exempt any undertaking from licensing requirements. Thus, exemption from licensing has been granted to certain categories of industrial undertaking on the basis of (i) size of investment, (ii) nature of the industry, and (iii) foreign exchange implication, etc., subject to certain conditions.

In July 1991, the Government of India announced a New Industrial Policy. The highlights of the policy measures are: (i) substantial reduction in the number of industries requiring compulsory licensing, (ii) promotion of foreign investments in India, (iii) public sector reforms, and (iv) package for the small and the tiny sectors of industry.

It has now been decided to do away with industrial licensing for all industries except the 18 broad-category industries specified in the First Schedule e.g. coal, petroleum, sugar, cigarettes, motor-car, hazardous chemicals, drugs and pharmaceuticals, etc.

Compulsory licensing in these areas has been considered necessary for the following reasons:

- (i) Safety, security and strategic considerations,
- (ii) Overriding environmental concern, and
- (iii) Need to regulate the production of articles of elitist consumption.

Barring these, the entrepreneurs will be allowed to freely set up and develop their industries to become more competitive nationally as well as internationally. The theme of the policy is continuity with change. While freedom has been given to the major industries to grow, reservation of items for the small-scale sector will continue, so as to promote the industrial and agro-industrial employment base.

SUMMARY

1. Deciding to Set Up a Small-scale Unit

The factors to be considered for setting up a small-scale unit are: (i) selection of the product, (ii) availability of raw materials and essential services, (iii) estimation and arrangement of capital, (iv) location of the enterprise, (v) procurement of machinery and equipment, (vi) recognizing statutory licences and local laws, and (viii) registration of a factory.

2. Selection of the Product

Some of the factors to be considered for the selection of the product may be listed as (i) personal background of the entrepreneur, (ii) marketability of the product, (iii) availability of technology/manufacturing process details, (iv) level of investment required, (v) availability of raw materials and other inputs, and (vi) reasonable profit margin.

3. Items Reserved for Small-scale Industries

The Government of India has reserved 836 items to be exclusively manufactured in the small-scale sector. It is, therefore, advisable to first have a look at the list of the reserved products and see if they are in consonance with the requirements of the particular entrepreneur.

4. Availability of Raw Materials and Essential Services

Development of a small-scale enterprise depends, to a great extent, upon the infrastructural facilities available or likely to be available in the area concerned. Infrastructural and essential services in industry generally imply availability of (i) raw materials, (ii) fuel, power, water, (iii) transport, and (iv) banking facilities. One needs to study the existing position as well as the future prospects with regard to such services in the area under consideration.

5. Estimation and Arrangement of Capital

A business enterprise requires capital for (i) investment in fixed assets, (ii) day-to-day working of the unit, and (iii) development and growth. The factors which affect fixed capital requirement may be listed as (i) size of the business firm, (ii) nature of business, and (iii) type of production process used. Working capital is of two types: (i) permanent, and (ii) temporary. It can be explained as (i) gross working capital, and (ii) net working capital. The factors which influence the working capital requirements are: (i) nature of business, (ii) size of business, (iii) manufacturing process,

(iv) production policy, (v) speed of turnover, (vi) terms of business deal, (vii) labour-intensity of units, (viii) raw materials, in relation to the total cost, (ix) total cash requirement, (x) growth and expansion, (xi) business cycle, (xii) dividend policy, and (xiii) banking facilities and miscellaneous factors.

6. Location of the Enterprise

The decision regarding location proceeds into two stages: (i) choice of location, and (i) selection of site.

Choice of location : Major factors to be considered while deciding the location of a unit may be described as (i) availability of raw materials, (ii) easy access to market, (iii) availability of labour, (iv) personal factors, and (v) existence of complementary and competing industries.

Selection of Site: In deciding a specific site the most important consideration may be either (i) the cost factor or (ii) the degree of customer accessibility.

Industrial Estate: An entrepreneur may decide to locate his enterprise in an industrial estate. It usually has facilities of water, transport, electricity, waste disposal, banks, post offices, canteens, first aid facilities, etc.

7. Procurement of Machinery and Equipment

Machinery required by factories may be either (i) general purpose, or (ii) special purpose. Before placing order for them, the following important factors are to be considered :

- (i) Capacity of the proposed unit.
- (ii) Quality of its output.
- (iii) Performance standard expected.
- (iv) Minimum economic scale of production.
- (v) Minimization of wastage.
- (vi) Availability of spare parts for the new machinery.

Procurement of machinery and equipment can be done on anyone of the following bases:

- (i) Outright purchase of these items.
- (ii) Hire-purchase through the National Small Industries Corporation Ltd.
- (iii) On lease basis from leasing companies.

8. Statutory Licences and Local Laws

All small-scale industries require permission from various competent authorities for smooth functioning of the enterprise. An entrepreneur seeks approval for specific regulation on the basis of (i) the product line chosen, (ii) the size of the unit, (iii) the number of workers employed, and (iv) the type of process used.

9. Registration of a Factory under the Factories Act

Registration of a small-scale unit is done at two stages (i) provisional registration, and (ii) permanent registration. Registration of a factory under the Factories Act 1948 is compulsory. Under this statute, there are three formalities that should be complied with. These are as follows:

- (i) Approval of factory building.
- (ii) Registration of the factory under the Factories Act.
- (iii) Annual renewal licence.

10. Registration under the Shops and Establishment Act

The Shops and Establishment Act, in almost all States provides for registration of shops and establishments compulsorily with the Chief Inspector or the Area Inspector appointed under this law. The registration is valid for one year. The registration certificate should be prominently exhibited at the premises of the establishment.

11. Setting Up a Large-scale Factory

The Government's industrial policy and licensing policy as enunciated in IDRA seeks to regulate the setting up of large-and medium-sized industrial undertakings which belong to any industry specified in the First Scheduled to this Act. Under the Industrial Development and Regulation Act, 1951 (IDRA) a licence is required to be obtained from the Central Government in the following situations:

- (i) Establishing a new industrial undertaking.
- (ii) Producing or manufacturing a new article by an existing unit.
- (iii) Expansion of existing units.

The highlights of the New Industrial Policy Statement 1991 are :

- (i) *Substantial reduction in the number of industries that require compulsory licensing.*
- (ii) Promotion of foreign investment in India.
- (iii) Public sector reforms.
- (iv) *Package for the small and tiny industrial sectors. It has been decided to do away with industrial licensing for all industries except the 18 industries.*

EXERCISES

I. Objective-type Questions

Are the following statements true or false?

1. Product selection is the first step for setting a small-scale enterprise.
2. Non-weight-losing raw materials exert little influence on plant location.
3. Current assets are those which cannot be converted into cash within an accounting period.
4. Working capital is required for investment in permanent assets.
5. Location is the general area and site is the place chosen within the location.
6. General purpose equipment requires major investment.
7. The National Small Industries Corporation supplies indigenous machinery on lease basis.
8. The New Economic Policy Statement 1991 has delicensed all industries.

II. Short-Answer-type Questions

1. List the factors to be considered in setting up a small-scale unit.
2. Briefly state the importance of transport and banking facilities for a manufacturing unit.
3. List four main factors that influence product selection.
4. Give importance of fuel, power and water in the location decisions.
5. Give three reasons why a business enterprise needs capital.
6. Briefly explain fixed and working capital.

7. State the factors to be considered before placing an order for machinery and equipment.
8. List three major factors to be considered for the location of a manufacturing enterprise.

III, Essay-type Questions

1. Examine the various considerations involved in the selection of a factory site.
2. Explain the factors that help in determining the working capital needs of a manufacturing unit.
3. Outline the procedure for procuring machinery and equipment by a small-scale enterprise.
4. Explain the formalities required for registration of a factory under the Factories Act 1948.
5. Describe the important features of the New Economic Policy Statement 1991, and the Industrial Development and Regulation Act (IDRA) in relation to the setting up of large-scale factories.
6. List the various authorities which are competent to issue licences relating to small-scale industries.
7. Explain the licensing requirements for setting up a large-scale factory.

CHAPTER 3

Factory Design and Layout

LEARNING OBJECTIVES

After reading this chapter, you should be able to—

- state the meaning of factory design ;
- define factory layout ;
- explain the importance of the factory design ;
- outline the factors affecting the factory design ;
- outline the different types of building designs, their merits, demerits and suitability;
- distinguish between product and process layout ;
- explain the advantages and limitations of the product and process layout; and
- outline the rules of law which regulate the factory layout.

3.1 Introduction

After the decision to set up a factory has been taken, the next step is to plan and organize the facilities, equipment, etc., in the factory. The factory design and layout are important aspects of the factory organization. The selection of a particular type of building and the method of arranging machinery and equipment have a direct relationship with the process of manufacturing. Therefore, a preliminary plan has to be formulated. On the basis of the plan evolved, the building must be constructed and the machinery, equipment, personnel and materials must be organized or procured.

The arrangement of machinery and equipment according to the manufacturing process is called the factory layout. The manufacturing process takes place inside the factory building. The factory building can be of different designs, depending upon the requirements and the purpose of the factory.

3.2 Factory Design

The factory, simply speaking, houses the productive processes, personnel and materials. The factory design encompasses the plan for a particular type of building, arrangement of machinery and equipment, and provision of

service facilities, ventilation, lighting and heating in the factory.

It, therefore, includes the building design and the arrangement of machinery and equipment inside the building, or the layout of the factory. It may be designed for flexibility and adaptability, so that it can also be used for other reasonably similar purposes. For example, if the manufacturing process is changed, the machinery and equipment may have to be re-arranged. Sometimes, the organization would like to go in for manufacturing another similar product. Then expansion of the existing facilities may be required. Therefore, the factory design should be able to adapt itself to technological and other changes.

It may not always be possible to construct a building for the factory according to a certain specific requirement. In that case, it would be advisable to purchase or hire a new or existing factory building. Then, minor changes and alterations could be made in it to suit the requirements of a particular manufacturing process.

3.3 Importance of Factory Design

The design of a factory has an important bearing on the operational costs of the organization. It may directly or indirectly affect many costs. Material handling costs can be minimized if the materials have to be carried over short distances. Maintenance costs are considerably reduced if a functional design is selected instead of a very artistic design. If the factory has provided for storage space in the design, then it would not have to depend upon outside warehousing facilities. The organization can also store sufficient raw materials so that the production process is not disrupted. Thus, costs can be minimized if the factory is designed according to a scientific and methodical approach.

The following points highlight the importance of a suitable factory design:

(i) *Supervision* : If the factory is designed to allow the supervisors to perform their duties with the minimum of movement, it helps in minimizing the cost of supervision. The design should ensure maximum visibility of operations by the supervisors. This will result in fewer supervisors being required to handle the same number of workers. Fewer supervisors will also reduce the possibility of grievances. Workers will be more contented if they have to report to one or two supervisors only.

(ii) *Services* : The costs of heating, power and light are directly affected by the factory design. The design should allow for proper insulation of the roof and walls so that heat losses are prevented, thereby reducing the costs of heating. The temperature can also be controlled by careful planning. The costs of distributing electricity for lighting and other purposes will depend upon the building design.

(iii) *Employee Efficiency and Morale*: Employees can increase their productivity if the factory is designed appropriately with adequate facilities of heating, lighting and ventilation. Proper lighting is essential to avoid fatigue due to eye-strain. Ventilation facilities provide for the free movement of fresh air which is important for the health and comfort of workers. If the factory is situated in a very cold place, then the building should be centrally heated so that the efficiency of workers can be increased. Machinery and equipment should be arranged in a manner so as to reduce the excessive movements of workers.

An adequate number of fire extinguishers should be placed at convenient points to ensure the safety of workers. Provision for fire escapes inside the building is also essential.

A pleasant environment definitely boosts the morale of the employees. It is a matter of great pride to the workers and other employees if they are provided with appropriate facilities like rest-room, canteens, toilets, medical room, etc.

This leads to higher quality of work and reduces wastage.

(iv) *Movement of Materials* : The movement of materials is an important consideration in the design of the factory. The design should ensure smooth movement of materials so that delays are minimized and work is not disrupted.

3.4 Factors affecting Factory Design

There are a number of factors which influence the factory design. The importance of these factors varies from factory to factory. These factors should be carefully considered before proceeding to design a factory.

(i) *Smoothness in Operations* : The purpose for which the factory is required is the foremost consideration in designing. The design should serve the function for which the factory is built. It should not be designed merely to enhance the beauty of the place. A circular building, for example, may look very attractive but it is difficult to effectively arrange the machinery and equipment in such a building. This also results in considerable wastage of floor space.

The shape of the building also depends upon the manufacturing process. All operations should be planned well in advance. The building should be constructed to ensure smoothness of these operations.

(ii) *Cost of Building* : The cost of constructing a building depends upon the factory design. The availability of finance is also an important consideration in the selection of a factory design. Expensive construction materials will increase the cost of the building. A simple functional design with bare walls and roof will obviously not involve much expenditure. Complicated designs of peculiar shapes with a large number of curves and turns without regard to the smoothness of operations will result in higher costs.

The cost of land is an important component of the cost of the building. If the building is

spread over a large area of land, total cost will increase. If land is expensive, the factory should be designed in such a manner that less land is required for construction.

(iii) *Location* : Certain locations have their own peculiar characteristics. A factory is designed taking into account these considerations. Certain products or manufacturing processes need a particular type of climate. It would be better to have the factory situated in that city or state or area where such climatic conditions exist so that expenditure in creating artificial conditions is minimized. Areas which are more prone to cyclones and floods would obviously not be preferred since they can cause a lot of destruction. The possibility of earthquakes should also be considered. For example, no entrepreneur may want to set up a factory in the Uttar Kashi area in Kumaun Hills in Uttar Pradesh after the earthquake of 1991.

(iv) *Product* : The product and the manufacturing process determine the arrangement of equipment and machinery, which in turn also determine the factory design. A large area will be required if the manufacturing process necessitates machines to be arranged in a particular sequence. Activities like ship-building and assembling of earth-moving machines and equipment have to take place in wide open spaces. But there are certain manufacturing activities which can be carried on less space. For example, in the printing business, the installation of a printing press would occupy a very little space. The area required will also depend upon the volume of operations.

The weight of the products and the machinery, equipment, and tools used in the manufacturing process also have to be given due consideration while designing a factory. If very heavy products are to be manufactured, the load to be borne by the floor will have to be kept in mind. It would be advisable to have a single storey building with the equipment situated on

the ground floor, if heavy manufacturing activities are to take place.

(v) *Flexibility* : The factory should be designed so that its expansion is possible whenever required. When the scale of operations expands, more machines and equipment need to be accommodated on the same premises. Difficulties may arise if the factory design is not able to adapt to these changes. It should be able to accommodate different types of operations with minor alterations.

Very low ceiling or light-floor-load-bearing capacity should be avoided, so that the building can be used for other purposes also.

(vi) *Materials Handling* : The design should be such that the raw materials can be transported in the factory without any difficulty. Wide doors may be required to handle specific types of raw material. Different types of equipment are often used to handle or transport material. If conveyor belts are used, too many turns and columns in the building should be avoided. In some cases, trucks may enter a building to deposit the raw materials inside (for example, coal). A specific height of the ceiling may be required to facilitate the entry of these trucks.

3.5 Types of Factory Buildings

The building should be designed only after the complete production plan and arrangement of machinery and equipment have been determined, so that the building exactly fits in with the production needs of the factory. As we know, the factory building is a place where machinery, equipment, materials and personnel are brought together for manufacturing purposes. The requirements of a factory with regard to the building may vary according to the manufacturing process, sequence of operations, and the arrangement of the machinery and equipment.

There are various types of buildings which can be acquired for the purpose. The factory building can be purchased, constructed or hired.

Primarily, there are two types of factory buildings: (i) single-storey or horizontal buildings, and (ii) multi-storey or vertical buildings.

3.5.1 Single-storey or Horizontal Buildings

Single-storey buildings normally consist of the ground floor only. In addition, basement or mezzanine floor may be constructed. This space can be utilized for storing materials or finished goods. If required, machines and equipment can be arranged in the basement also as per the production plan. The machinery and equipment have to be arranged according to a predetermined sequence so that production is not disrupted. The layout in a single-storey building will have to be planned according to the space available. These buildings require a large area of land, since the manufacturing operations have to be carried on one floor. Therefore, a single-storey building is considered only when the cost of land is low. Normally, land is available at cheap rates only when it is situated away from the city or in the rural areas. The Government also encourages entrepreneurs to start factories in backward areas.

Single-storey buildings are constructed and preferred because of the following reasons:

(i) *Low Initial Cost* : A single-storey building can be constructed at a lower cost since less expenditure is incurred on the foundation of the building. Iron and steel, and cement form a major part of the total cost of a building. Since the quantity of iron and cement required is less, the cost of erecting the building is considerably reduced.

(ii) *Ease in Material Handling* : In a single-storey building, since the machinery and equipment are arranged on one floor, it becomes easy to handle raw materials, spare parts and inventory-in-progress. The workers also do not experience any difficulty in transporting materials from one department to another. Back-tracking of materials can be avoided since they are not moved to and fro. Consequently, delays are also minimized.

(iii) *Fewer Obstacles* : Production can go on smoothly only if there are no obstacles in work-in-progress. Columns of iron and steel used in construction are the main obstacles which hinder the free movement of materials and workers. Since fewer columns are used for the construction of single-storey buildings, obstacles are reduced to a great extent resulting in smoother operations.

(iv) *Possibility of Expansion* : The scale of operations in the factory may increase in future and more space may be required for expansion. In single-storey buildings, there is a possibility of constructing and extension to meet the needs of extra space. These buildings are normally constructed on very large areas of land. It is, therefore, easier to expand operations if the factory is housed in a single-storey building.

(v) *Natural Lighting* : Since the entire production process, machinery and equipment are located in a single-storey building, there will be adequate and better natural lighting throughout the factory. Big side windows and skylight in some parts of the roof may be devised for allowing sufficient day-light during working hours. Where it is important to match the colours in a product, day-light is the only source of illumination because of its balanced natural colour.

(vi) *Efficient Supervision* : The supervision of the production process is easier. A glass cubical can be placed at the centre or at a strategic position for supervisors so that the entire production can be controlled. Because of the existence of a transparent house for the supervisor, the worker will be under continuous pressure of being watched. The supervisor can also walk through the space between the machines and cover all the production stations in less time.

(vii) *Reduced Fire Hazards* : Since the building is spread over a large horizontal area, fire hazards, the sources of which may be electricity and chemicals, can be minimized by direct control and frequent inspection of different

junction boxes and other electrical power converters. Safety and fire prevention measures are easily accessible in single-storey buildings.

(viii) *Flexibility of Layout* : One of the main advantages of this type of buildings is the flexibility of physical arrangement of production facilities. As and when the process of manufacture changes, the production facilities will have to be altered. Suitable rearrangement can be easily done in single-storey buildings as all the machinery and equipment are situated on one floor. Single-storey buildings can also accommodate heavy equipment and machinery, if desired.

Limitations

Single-storey buildings suffer from some limitations also, which are outlined as under:

(i) *High Land Costs* : Single-storey buildings require larger area of land for construction. This, in turn, requires higher investment in land if the site is located in an industrial town. To reduce the cost of land, the factory will have to be located at the outskirts of the city, which may increase the transportation costs.

(ii) *High Cost of Heating* : Certain manufacturing activities require a particular temperature to be maintained throughout the building. There is also a chance of loss of heat through the roof. Hot air, by a natural process, has got a tendency to move upwards. Hence, it is difficult to divert the direction of hot air to a horizontal path to cover a single-storey building. This increases the cost of providing heating facilities.

(iii) *Lack of Advantages of Gravitational Flow* : The advantages of gravity of flow cannot be utilized in a single-storey building. And it is more costly to take the advantage of conveyor belts to transport the product to different stations.

3.5.2 Multi-storey Buildings

Factories can be housed in multi-storey buildings also. These buildings have a vertical structure.

They consist of several floors. The machinery and equipment in them have to be arranged on different floors according to the production plan. Multi-storey buildings provide more space. Also, various other activities can also take place in the same building. The office can also be situated there itself. These buildings are normally used when it is possible to carry on part of the manufacturing activity on different floors. Unless it is convenient to arrange machinery and equipment in the desired or required manner, these buildings are not preferred.

Advantages

The advantages of multi-storey buildings are the following:

(i) *Less Area Required*: Since multi-storey buildings have a vertical structure, they require less land for their construction. In cities and industrial towns, land is available at very high prices. It becomes relatively cheaper to build such structure and the overall cost of the building is reduced.

(ii) *More Space for Storage* : In these buildings, materials, inventories, spare parts, etc., can be easily stored. Lofts and attics can be specially built for the purpose.

(iii) *Lower Cost of Heating* : Since the area to be heated in these buildings is small, heat losses are considerably reduced. Common ducts can be used for providing heating facilities on every floor. The initial investment in purchasing the heating equipment is much lower. This decreases the overall costs of maintaining temperature at a particular level.

Limitations

Vertical buildings suffer from many limitations also. These are outlined as under:

(i) *High Cost of Foundation* : The foundation for a vertical building requires heavy capital investment. A considerable amount of iron and steel, cement and other expensive

materials are required for constructing multi-storey buildings. Iron and steel form the major part of the total cost of the building. This increases the overall building cost.

(ii) *Wastage of Floor Space* : Raw materials and semi-finished goods have to be transported from one floor to the other during the manufacturing process. Elevators and lifts have to be provided for this purpose. Also, provision of fire escapes is essential in multi-storey buildings, as there is greater danger of fire accidents. These involve considerable wastage of floor space, and additional expenditure has to be incurred.

(iii) *Difficulty in Material Handling* : In multi-storey buildings, machines and equipment are situated on different floors. Raw materials and inventories-in-progress, therefore, have to be moved from one floor to another, which involves difficulty. More often, machines are not free to perform operations on the materials and semi-finished goods. In such cases, a lot of time is wasted and materials have to be moved to and fro. Therefore, back-tracking of materials is also the maximum.

(iv) *High Cost of Supervision* : The cost of supervision is increased considerably as more supervisors are required for different floors. Effective supervision becomes difficult as it is not easy to keep a check on the activities of workers also.

(v) *Rigidity in Layout* : The machinery and equipment are arranged according to a particular plan on each floor, which cannot be changed easily. If the sequence of operations changes, alterations might be required. But it is not possible to shift machinery from one floor to another whenever needed.

(vi) *Poor Natural Lighting* : The ground and middle floors of the building get insufficient natural light. Therefore, artificial lighting arrangements have to be made, resulting in higher costs.

(vii) *Limited Floor-load-bearing Capacity* : The machinery and equipment used in certain manufacturing activities is very heavy and bulky. Heavy machines and equipment cannot be used in a multi-storey building since the weight to be borne by the floor is limited. Vibrations may occur while operating the machinery, which is dangerous in a tall structure of this type. The building may not be able to withstand the weight of very bulky raw materials and of the final product also.

(viii) *Difficulty in Expansion* : In multi-storey buildings, expansion is extremely expensive unless planned for in the original design and construction. A strong foundation with more columns of iron and steel have to be laid down for a vertical building. It is not easy to construct another floor on top of the building whenever required. Horizontal expansion cannot take place since there is no extra space available.

Suitability : Both single-storey and multi-storey buildings have their advantages and limitations. Depending upon the requirements of the factory and the availability of land at cheaper rates, a decision has to be taken to construct or hire either a horizontal building or a vertical building.

Single-storey buildings are suitable in the following cases:

- (i) When land is available at cheap rates.
- (ii) When the product is heavy and material handling is difficult.
- (iii) Where natural lighting is desired.
- (iv) Where the layout is changed frequently.

Multi-storey buildings are suitable in the following cases:

- (i) When the products manufactured are light in weight.
- (ii) When the cost of land is very high.

3.6 Factory Layout

The factors of production like men, materials and machinery have to be organized in such a way that they can work in harmony. A plan has

to be formulated to integrate the factory grounds, building, machinery, equipment and labour so that production goes on smoothly. The raw material should move from one machine to another without any delay. Machinery and equipment have to be arranged in a sequence so that the manufacturing process is not disrupted. Also, coordination of these basic factors of production is very important. A master plan has to be drawn up to coordinate the entire production process and the working of other departments in a manufacturing organization. This plan is commonly referred to as the *factory layout*. In a broader sense, this is what is meant by factory layout. The entire process of converting the raw materials into finished product has to be planned and decided well in advance. It would also include the expenses, the volume of production, and the schedule of timings for the manufacturing process. The layout of the factory has to be determined in a manner which allows for a fast flow of materials at the lowest cost and minimum time. Therefore, the machinery and equipment to be used in the manufacturing process should be arranged in a manner so as to facilitate the free movement of materials. The narrow definition of factory layout would then be the arrangement of machines and equipment inside the factory building.

The machines and equipment in a factory can be arranged in different ways. Accordingly, there are three types of layout: (i) product layout, (ii) process layout, and (iii) combined layout.

3.6.1 Product Layout

In product layout, the machines and equipment are located according to the sequence required for manufacturing a product. Production in a factory takes place according to a predetermined schedule. The path that the raw material has to follow is decided in advance. The raw material is processed by the first machine and then it goes on to the next, and finally it comes out of the last

machine as a finished product. The output of one machine becomes the input of another. The raw material that becomes a semi-finished product or work-in-progress inventory in the end comes out as the finished product. This kind of layout is also called straight-line layout. The machines have to be arranged separately for each product. Therefore, this layout is preferable when only one or two types of similar products are manufactured. If there are two products, two lines of machines have to be arranged according to the sequence of operations for each product. Product layout is more economical if there is a large volume of standardized products, like chemicals, sugar and cement.

Advantages

The advantages of product layout can be outlined as follows:

(i) *Facilitates Movement of Materials* : Materials move along a fixed path, and are transmitted from one machine to another according to a predetermined schedule. Since the machines are already arranged according to the sequence of operations, the cost of handling materials is reduced. Also, as there is no criss-crossing or back-tracking of materials, considerable time is saved.

(ii) *Reduced Level of Inventory* : Since production goes on continuously, less inventories are required. The raw material is fed into the first machine, which then goes to the next and finally comes out as a finished product. Work-in-progress inventory is considerably reduced. Consequently, less storage space is needed.

(iii) *Easy Control and Supervision* : The control and supervision over the manufacturing process is simplified. Since all the machines are arranged in a line according to the sequence required for manufacturing the product, it is easier to supervise the operations.

(iv) *Economy in Space* : Less area is required for arranging the machines and equipment. It is

normally required to place the machines in a straight line so that the raw material can easily pass from one machine to the other.

(v) *Saving in Time* : Mechanized equipment and conveyor belts can be used for transporting materials. This helps in considerable saving of time.

Limitations

Product layout suffers from certain limitations also, which are outlined as under:

(i) *Interruptions in Work* : Since the material has to pass on from one machine to the other, there is a possibility of the work being disrupted. Even if only one machine breaks down, the whole production process comes to a standstill until the machine is repaired or replaced.

(ii) *Inflexibility* : Product layouts are inflexible. Changes cannot be easily made since the entire production schedule will have to be altered first.

(iii) *Underutilization of Machines* : If one product needs a particular machine for a short period only, it cannot be used by another product line or department as the sequence will be disturbed. Therefore, every department will need to have its own separate machines. This involves a considerably high cost and leads to duplication of machines, and, consequently, underutilization of the existing machines.

3.6.2 *Process Layout*

In process layout, similar machines are grouped together according to the work that they perform. This results in the creation of different departments in the factory. The process layout is also called functional layout. For example, in the grinding department all grinding machines will be placed together, in the drilling department, all drilling machines, and so on. The raw materials then goes to one department so that the machines can perform the required operations on them.

Consequently the partly-finished product enters the next department and then the next. Thus, the raw material is transported from one department to another for the required treatment by the different machines. These departments may be situated anywhere in the factory. The raw material and semi-finished goods, therefore, have to be transported via long distances. Work has to be allocated to each department so that the machines are not lying idle and they are utilized to their maximum capacity.

Advantages

Process layout has certain advantages which are outlined as follows:

(i) *Flexibility* : There is greater flexibility in production schedules. The machines are grouped together in departments according to the work they perform. The products requiring different operations to be performed on them can follow diversified routes and paths throughout the plant. Raw materials need not follow a fixed route.

(ii) *No Interruptions* : The manufacturing process is not disrupted due to breakdown of machines. Since similar machines are located in one department, the work can be easily transferred to another machine in the same department. Consequently, there are no unnecessary delays.

(iii) *Fuller Utilization of Machines* : The machines can be utilized to their full capacity. If a particular machine is required for a number of jobs, it can perform the first job and then go on to the next job. Thus, a number of jobs can be performed on the same machine.

(iv) *Specialization* : Specialization is possible in supervising operations. A supervisor can be appointed for each department, who will be responsible for the work of his own department.

Limitations

Process layout suffers from certain limitations, which are outlined as follows:

(i) *High Material-handling Costs* : The material-handling and transportation costs in the case of process layout are very high. Manual labour may be required to transport materials and semi-finished goods from one department to another. Equipment is also used for this purpose. This adds to the cost of production.

(ii) *Requirement of More Storage Space* : The materials and semi-finished goods have to be transported from one department to another for the machines to perform the required operations on them. It is not necessary that the machines are always available when required. They may be performing some other job. That is why, stocks of materials and semi-finished goods get accumulated. Consequently more storage space is required.

(iii) *Complicated Routing and Scheduling* : Production routing and scheduling becomes very difficult and complicated. The path that the raw material has to follow will depend upon the availability of the machine. A record of for how long a particular machine is being used has to be kept.

(iv) *More Floor Space* : Since machines have to be grouped in separate departments, more space is needed.

3.6.3 Combined Layout

It is very difficult to carry out production after arranging the machines and equipment strictly according to either the product layout or the process layout. Both these layouts have their own advantages and limitations. A combination of both these layouts can be evolved according to the requirements of the manufacturing process. Some of the machines and equipment can be arranged in a line according to the product layout. Other machines used for general purposes can be grouped in separate departments. The raw material can first move along the machines arranged according to the product layout. After that the partly-finished goods can be transported

to another department for the required operations to be performed on them. In this manner, machines which are more commonly used, can be utilized to their full capacity. Also, they can be grouped together in separate departments. Thus, the mixed form of layout can combine the advantages of both the product layout and the process layout.

3.7 Considerations in Deciding the Layout

The selection of a particular type of layout depends upon the requirements of the manufacturing process, product to be manufactured, and so on. The layout of a plant should be such so as to allow for free movement of materials and a place for storing of materials. It should also provide for certain other facilities for the employees like safety devices for fire hazards, rest and recreation rooms, canteens and washrooms on every floor. While taking a decision on the layout, there are other considerations like lighting, ventilation, heating and service facilities, which have also to be looked into. They are explained below.

(i) *Lighting* : Adequate provision of lighting is essential in a factory. It is a legal requirement also as per the Factories Act, 1948. Good illumination eliminates eye-strain and reduces fatigue. It increases efficiency of workers and other employees. Workers are able to increase their speed of working and thereby achieve a higher output. This, in turn, results in reducing the overall cost of production. Uniform lighting facilitates vision of all corners and places and ensures maximum utilization of floor space. Accidents are definitely minimized with properly lighting facilities. Effective supervision is possible since the entire floor area is visible. At the same time, changes in arrangement of machinery and equipment can be easily made as the whole place is equally illuminated.

(ii) *Ventilation* : No activity can take place without the presence of air. Air is important both

from the point of view of human beings as well as manufacturing activities. Fresh air has to be supplied to a building or enclosed space and the existing or stale air needs to be removed. Factory layout, therefore, has to provide for proper ventilation facilities. Ventilation may be achieved either naturally or artificially. Openings in roofs and windows in walls allow movement of air to take place. This is generally referred to as natural ventilation. Free movement of air takes place depending upon the force of wind. In a factory where furnaces are burnt and large quantity of heat is released, natural ventilation is provided by roof opening, chimneys, etc. It is the least expensive method since no devices are required.

Ceiling fans, exhaust fans, etc., are also used for the purpose of ventilation. Exhaust fans suck out stale air from inside the building. Ceiling fans facilitate the movement of air inside.

During the process of manufacture, certain chemicals are used and fumes, dust or gases are released. These elements can be poisonous and prove to be very dangerous to the health of workers and other employees. These gases, fumes, etc., have to be removed from the vicinity and fresh air introduced. This can be achieved only with proper facilities of ventilation.

(iii) *Heating* : Certain manufacturing activities require a particular temperature. The factory would then need to have heating facilities. There are different means of heating or raising the temperature of a particular department in the factory. These include heaters, convectors or centralized heating plants. Heaters or convectors can be used whenever required in the existing building. But, if a centralized heating system is to be installed, it has to be provided for in the building design and factory layout. The construction of the building will have to take place accordingly. Ducts have to be provided in the roofs and walls so that temperatures are uniformly maintained.

The climate of certain places may be too cold and uncomfortable. It is advisable in such cases to have the factory and office centrally

heated. This would promote the efficiency of workers and other employees, and increase output.

(iv) *Service Facilities* : Proper service facilities boost the morale of employees and thus increase productivity. The layout of a factory should include proper service facilities, which are essential for the comfort and welfare of the workers. Toilets, water coolers, etc., should be conveniently located. There should be provision for these on every floor if it is a multi-storeyed building. Proper medical care should be made available whenever required. There should be a medical room in the factory equipped with First Aid facilities and essential medicines. Fire escapes, stairways and fire extinguishers are important for the safety of workers. These facilities are also compulsory under law. Causes of accidents like slippery floors, inadequate exits and less space between machinery should be avoided in a layout.

3.8 Rules of Law Regulating the Factory Layout

We have noted in the previous chapter the rules relating to the registration of factories with the Chief Inspector of Factories of the concerned State Government. He is the authority for issuing licences and approving the site and construction plans. All State Governments have made rules to direct every factory management to get the factory plans approved by the Government. While approving the plans the Chief Inspector has to ensure that the provisions of the Factories Act are duly complied with. Most of these provisions relate to the health and safety of workers. The Act, for example, lays down requirements

concerning provision of sufficient lighting, ventilation, control of temperature, provision of service facilities like toilets, fire escapes, stairways, etc.

If we define layout in its broader sense, the above-mentioned provisions become rules governing the factory layout. All these provisions have been outlined in Chapter 7 under the heading, "Employment Conditions of Factory Workers and Legal Requirements." If we take a narrow view of plant layout, i.e., arrangement of machines and equipment, we shall be concerning ourselves with those provisions of the Act which relate to fixing and casing of machines, lifts, chains, ropes, etc. The relevant provisions of the Act in this regard are outlined below:

(i) All dangerous parts of every machine should be securely fenced, especially those which are likely to cause injury to workmen due to their movement.

(ii) In the case of self-acting machines, no traversing part is allowed to run within a distance of 45 centimetres from any fixed structure which is not part of the machine.

(iii) All machines driven by power, every set screw or key on any revolving shaft, wheel, etc., should be so sunk or encased as to prevent danger.

(iv) If any person is working on or near the wheel track of a travelling crane effective measures should be taken to ensure that the crane does not approach within six meters of the place where that person is working.

(v) If in any factory any plant or any machine is operated at a pressure above the atmospheric pressure, effective measures should be taken to ensure that the safe working pressure of such a part is not exceeded.

SUMMARY

1. Meaning and Importance of Factory Design and Factors affecting the Design

Factory design encompasses the plan for a particular type of building, arrangement of machinery and equipment and other considerations like service facilities, ventilation, lighting and heating in the factory.

The design has an important bearing on the operational costs of the organization. The following points highlight the importance of a suitable factory design: (i) supervision; (ii) services; (iii) employees' efficiency and morale; and (iv) movement of materials. Certain factors should be carefully considered before proceeding to design a factory. These are: (1) smoothness in operations; (ii) cost of building; (iii) locations; (iv) product; (v) flexibility; and (vi) material handling.

2. Types of Factory Buildings

The factory building is a place where machinery, equipment, materials and personnel are brought together for manufacturing purposes. The building can be purchased, constructed or hired. There are two types of factory buildings.

(i) *Single-storey Buildings or Horizontal Buildings*: They normally consist of the ground floor only. A basement or mezzanine floor may also be constructed. Since they require a large area of land, they are preferred when the cost of land is low.

Single-storey buildings have certain advantages, which are (i) low initial cost; (ii) ease in material-handling; (iii) fewer obstacles; (iv) possibility of expansion; (v) natural lighting; (vi) efficient supervision; (vii) reduced fire hazards; and (viii) flexibility of layout.

Such buildings suffer from some limitation also, such as (i) high land costs, (ii) high costs of heating, and (iii) lack of advantages of gravitational flow.

(ii) *Multi-storey Buildings*: These buildings have a vertical structure and consist of several floors. They provide more space. Machinery and equipment are arranged on different floors. The advantages of such buildings are: (i) requirement of less area, (ii) more storage space, and (iii) low cost of heating.

The limitations are: (i) high costs of foundation, (ii) wastage of floor space; (iii) difficulty in material-handling; (iv) high cost of supervision; (v) rigidity in layout; (vi) poor natural lighting; (vii) limited floor-load-bearing capacity, and (viii) difficulty in expansion.

3. Factory Layout

A plan has to be formulated to integrate the factory grounds, building, machinery, equipment and labour so that production goes on smoothly. Factory layout refers to the Master Plan which coordinates the entire production process and other departments in a manufacturing organization. The machinery and equipment also have to be arranged in a manner so as to facilitate free movement of materials.

4. Types of Layout

There are three types of layout (i) product layout, (ii) process layout, and (iii) combined layout.

(i) *Product Layout*: In product layout, machines and equipment are located according to the sequence required for manufacturing a product. The path that the raw material has to follow is decided in advance, and the production takes place according to a pre-determined schedule. The advantages of production layout are: (i) facility in movement of materials; (ii) reduced level of inventory; (iii) easy control and supervision, (iv) economy in space, and (v) saving in time.

The limitations of product layout are: (i) interruptions in work, (ii) inflexibility, and (iii) under-utilization of machines.

(ii) *Process Layout* : In process layout, similar machines are grouped together according to the work that they perform. This results in the creation of different departments. The raw material is transported from one department to another for the required treatment by the different machines.

Process layout has certain advantages (i) flexibility; (ii) no interruption, (iii) full utilization of machines, and (iv) specialization. It has some limitations also; (i) high material-handling costs, (ii) requirement of more storage space, (iii) complicated routing and scheduling, and (iv) requirement of large area.

(iii) *Combined Layout* : A combination of both the product and process layout which can be evolved according to the requirements of the manufacturing process, is known as the combined layout. The raw material can first move along the machines arranged according to product layout, and then the partly-finished goods can be transported to another department for the required operations to be performed on them.

5. Considerations In Deciding the Layout

The selection of a particular type of layout depends upon the requirements of the manufacturing process. The product to be manufactured and service facilities have to be looked into while taking a decision on the layout.

(i) *Lighting*: Lighting is essential in a factory. It eliminates eye-strain and increases efficiency of workers, thus resulting in reduction of the overall costs of production.

(ii) *Ventilation*: Air is important both from the point of view of human beings and the manufacturing activities. Factory layout has to provide for proper ventilation facilities. Ventilation may be achieved either naturally or artificially.

(iii) *Heating*: Certain manufacturing activities require a particular temperature. The factory would then need to have heating facilities. Heaters, convectors, or centralized heating facilities can be used for the purpose. The building design and the factory layout have to provide for installing a centralized heating system and construction will take place accordingly. If the climate is too cold, then it is advisable to have the offices and factory centrally heated.

(iv) *Service Facilities* : Proper service facilities boost the morale of employees and increase productivity. Medical rooms, rest and recreation rooms, canteens and washrooms should be provided for the welfare of workers. Fire escapes and extinguishers are important for the safety of workers.

6. Rules of Law Regulating the Factory Layout

The factories Act, 1948 is the principal law under which provision of certain facilities in factories is required. Many of the facilities which relate to health, and safety and welfare of workers concern their plant layout also, provided, of course, we take a broad view of the term 'plant layout'. If we define plant layout narrowly, i.e., arrangement of machines and equipment, then the relevant provisions for us are those which relate to (i) fencing of machinery; (ii) self-acting machines; (iii) casing of revolving shafts, etc.; (iv) installation of cranes; and (v) measures for safe working of pressure plants.

EXERCISES

I. Objectives-type Questions

Are the following statements true or false?

1. A suitable factory design can boost the morale of the employees.
2. The most important factor to be considered in factory design is the attractiveness of the building.
3. It is difficult to re-arrange machines and equipment in a multi-storey building.
4. According to product layout, machines are grouped together in a department.
5. In process layout machines are underutilized and less floor space is required.
6. The law does not put any restriction on plant layout.

II. Short-Answer-type Questions

1. What is meant by factory design and layout?
2. Why is it important to have a suitable factory design?
3. In which situations is it more suitable to construct a multi-storey building?
4. What is meant by product layout?
5. What kind of industries arrange their machines according to process layout?

III. Essay-type Questions

1. Describe the factors affecting factory design.
2. Enumerate the advantages and limitations of multi-storey buildings.
3. Explain the relative advantages of a single-storey building vis-a-vis those of a multi-storey building.
4. What kind of a layout would you recommend for a factory producing chemicals? Give reasons.
5. Explain the points of distinction between the product layout and the process layout.
6. Explain the various considerations to be kept in mind while deciding the factory layout.
7. Outline the legal provisions which regulate factory layout.

CHAPTER 4

Internal Organization of a Factory

LEARNING OBJECTIVES

After reading this chapter, you should be able to —

- state the meaning of departmentation;
- explain operating departments and service departments in an organization;
- outline the departmentation in a factory;
- state the duties and functions of the factory manager;
- explain the status, position, authority and responsibility of the factory manager;
- define factory manual;
- describe the contents of the factory manual;
- state the merits of manuals;
- appreciate the importance of an organization chart; and
- draw the organization chart of a typical factory.

4.1 Introduction

Departmentation is the systematic division of work into sub-units in an organization. Each sub-unit is called a department. Departments are formed on the basis of grouping similar activities. Their aim is to allow similar and logically related activities to occur together. The person who is in charge of a department is known as the departmental head. The departmental head is generally a specialist in the area of the concerned activities. Therefore, departmentation involves identifying the tasks or duties, analysing the

details of each task, describing each of the functions, entrusting the functions or grouped activities to the departmental heads, and defining the authority and responsibility of the departmental head. At the outset, we should be clear in our mind about departmentation at the organisational level and departmentation of only the factory part of it.

4.2 Departmentation in a Manufacturing Organization

By manufacturing organization here we mean the factory and all other departments of an or-

ganization which help in the realization of the goals of the organization. Generally in all manufacturing organizations departmentation is based on their major functions. The functions in a manufacturing organization are of two categories: (i) primary functions, and (ii) derivative functions. The primary functions of an organization are production and marketing. As the size of the organization increases, new activities develop and the primary functions require more specialization. The growth in size necessitates the splitting of the primary functions and placing them under separate departments. The new functions that are developed owing to growth are called derivative functions. These new functions appear in the organization at the secondary level. Sometimes, the distinction between functions is made on the basis of operating departments and service departments. This classification is also similar to the one we just noted. There is difference of names only. Therefore, all operating departments are also known as primary departments. Likewise, all derivative functions can be referred to as service departments. We may explain these two types of departments as under :

Operating Departments : The departments concerned with the physical operations of the organization are called operating departments. The production department is concerned with the conversion of raw materials into finished products. Marketing involves distribution of the finished products to the customers. Production and marketing departments are directly involved with physical facilities and operations of the organization. Production and marketing departments are managed by specialists in their respective area of operations. The departmental heads directly report to the chief executive. They are senior executives of the organization. These departments appear at the first level in the organization.

Service Departments : The departments which provide services, assistance and advice

are called service departments. Service departments are essential to the smooth and efficient functioning of the operating departments. The service departments render services to the entire organization. These departments are formed for the purpose of economy, efficiency and control. Service departments are also referred to as 'auxiliary' or 'support' departments. Persons specialized in each area of service are appointed as departmental heads. These departments appear at the second and subsequent levels in the organization.

A list of the operating and service departments in a manufacturing organization can be presented as follows:

Operating Departments

Production Department
Marketing Department

Service Departments

Purchasing Department
Production, Planning and Control Department
Inspection and Receiving Department
Stores Department
Quality Control Department
Research and Development Department
Personnel Department
Recruitment and Training Department
Sales Promotion Department
Advertising Department
Transport and Distribution Department
Despatch Department
Finance Department
Accounting Department
Cost Accounting Department
Audit Department
Statistical Reports Department
Electronic Data Processing Department
Market Research Department

Depending on the size of the organization, some of the departments can be clubbed into

single departments like Finance and Accounting, Statistical Reports and Data Processing, etc. This clubbing is for the purpose of achieving better coordination between departments. In large and medium-sized organizations, it will be very unwieldy to manage day-to-day operations without departments.

4.2.1 Departmentation in a Factory

We have just noted departmentation in a manufacturing organization. As we observed earlier, a factory is only one of the entities in an organization. An organization includes other departments like the marketing department; also a large number of service departments may exist at the organizational level like research and development, financial planning, market research, personnel, etc. All these departments exist outside the factory and serve the larger organization, and not just the manufacturing process. Sometimes, however, these departments may be existing at both the organizational and the factory levels. For example, accounts department is found both at the factory level and the organizational level. Likewise, a factory may have a separate personnel department to look after factory employees only. It is interesting to note, therefore, that even a factory may have many departments, which could be under the control of the works manager or the factory manager, depending upon the size of the factory. The manufacturing process involves an interaction of departments like production, purchase, stores, repair and maintenance, engineering, factory accounts, quality control, etc. Departmentation in a factory means dividing the factory activities into these departments. Whether a factory will have all or some of these departments will depend upon the size of the factory or the manufacturing unit. A smaller factory may just have production, purchase and accounts departments. On the other hand, a larger factory may have all of them or may add even some more, depending upon its need.

4.2.2 Benefits of Departmentation

Departmentation has many advantages. These can be listed as under:

- (i) The process of departmentation helps in promoting efficiency and effective control in the organization.
- (ii) The division into sub-units reduces duplication of work and minimizes overlapping of functions.
- (iii) Depending upon the nature of operations, each department can be looked after by individuals having specializations. This helps to secure the intended results more effectively.
- (iv) Departmentation enables the top management to channelize its efforts to direct, coordinate and control the activities of all departments. Likewise, in a factory, departmentation enables the works/factory manager to perform his work more efficiently.

4.3 Factory Manager

By the word 'factory', as we noted earlier, we mean primarily a manufacturing unit. The person who manages all manufacturing activities in a factory is the factory manager. He performs the job of directing and guiding the work of the assistants and operators. In this process, he is also responsible for the execution of the production policies of the factory. Thus, he is a line executive or front line manager. The position of the factory manager may vary from organization to organization. But he plays an important role in all manufacturing organizations and is a necessary link between the management and the workers. Therefore, he has to take care of the needs and expectations of both the management and the workers.

4.3.1 Functions of a Factory Manager

The functions of a factory manager can be outlined as follows:

(i) *Planning and Organizing the Work* : This is an important function of a factory manager. He has to formulate plans, procedures and methods of doing the work. He assigns the work to various subordinates according to their skills, interest and efficiency. He makes arrangements for the procurement of materials, tools and equipment to ensure uninterrupted production.

(ii) *Issuing Orders and Instructions* : A factory manager is required to issue a number of orders to his subordinates. These may be intended to initiate, modify or stop any action. He is also required to guide and instruct the workers in the performance of their work to achieve the desired results.

(iii) *Motivating Workers* : This is another important function of the factory manager. He should inspire and motivate his subordinates to work hard for the achievement of the desired goals. Towards this end, he has to build confidence and enthusiasm among workers so as to get the best out of them. He may also suggest improvements or introduction of new methods for the performance of work so as to increase productivity.

(iv) *Maintenance of Discipline* : It is the duty of the factory manager to enforce discipline amongst his subordinates. For this, he should provide good leadership and be fair and reasonable in dealing with the subordinates. Also, he should set high standards of performance. He should implement carefully rules and regulations of the factory with regard to the performance of work.

(v) *Ensure Proper Working Conditions* : The factory manager should ensure proper working conditions as to lighting, heating, ventilation, etc., for workers. He should also see that the machines, tools and equipment used by the workers are kept in good working condition.

(vi) *Provide Safety* : Maintaining proper safety of workers and operators is another

important function of a factory manager. He should ensure provision of safe tools and equipment to his workers and also make them safety conscious. Further, he should provide for sufficient safety devices and train workers in their proper use. He should ask for regular inspection of machines, tools and equipment so as to avoid accidents.

(vii) *Effective Communication* : The factory manager serves as a link between the management and the workers. Therefore, he must ensure an effective communication system so that information at the various levels in the organization flows quickly, smoothly, and without interruption.

(viii) *Maintenance of Records* : The factory manager is required to maintain, with the help of assistants, records of the performance of workers. Sometimes, he may also be required to maintain the records of material, production, hours worked etc. Further, he has to submit reports on the performance of foremen, operators and workers, as also of the utilization of materials, stores, tools and equipment and machinery.

(ix) *Training Workers* : He is usually involved with the training of workmen so as to acquaint them with the latest and the most efficient methods of production.

(x) *Handling Grievances* : The factory manager should listen to the grievances and complaints of the workers and take all possible steps to remove them. He should bring these grievances to the notice of the management so as to get them settled quickly.

4.3.2 Status and Position of Factory Manager

The factory manager, as said earlier, is a link between the management and the workers. He is responsible for the quality of and quantity of production. He usually has under him foremen, assistant foremen, operators and workers.

From the point of view of administrative control, he is the head of the production

department and enforces a certain decorum in the production process. In bigger organizations, he may report to the works manager who will be the head of the production department. He recommends for the appointments, promotion, demotion, suspension and dismissal of workers. Though a factory may have a separate personnel department to look after the above functions, yet the factory manager, in actual practice, has control over them, and the personnel department gives effect to the recommendations made by him. Thus, to the foremen, operators and workers, the factory manager is the representative of the top management.

In the organizational structure, he occupies a position which is below that of the works manager but above that of the superintendent, foremen and workers. Figure 4.1. shows the position of a factory manager.

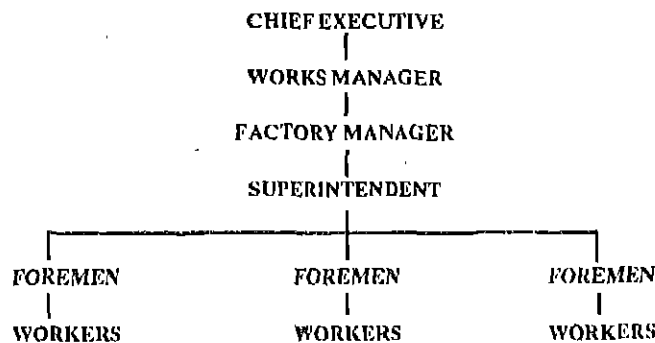


Fig. 4.1 The Position of a Factory Manager

4.3.3 Authority and Responsibility of Factory Manager

The factory manager is vested with line authority, which directly concerns the realization of the goals of the organization. He is responsible for making important decisions like initiating action and checking the work while it is being done. His job consists of planning and allocation of work, instructing the subordinates, and providing

them direct and immediate guidance and control. The authority flows vertically from top to bottom. As a line manager, he discharges all managerial functions of planning, organizing, directing and controlling the operations of the workplace.

As a link between the management and the workers at the operating level, the factory manager possesses a two-fold responsibility of satisfying the needs of both of them. His responsibilities towards the management and the workers can be enumerated as under:

Responsibilities towards Management: His responsibilities towards the management are:

- (i) to initiate action and get the work done;
- (ii) to ensure maximum utilization of the resources;
- (iii) to inform the higher levels of management about the progress in the performance of work;

(iv) to know the plans and expectations of the management; and

(v) to bring to the notice of the management the complaints, grievances and suggestions of the workers.

Responsibilities towards Workers : His responsibilities towards workers are:

- (i) to listen to the complaints, grievances and suggestions of workers and to help them in the performance of their work;

- (ii) to present the worker's problems before the management;
- (iii) to inspire his subordinates and develop team spirit among them;
- (iv) to develop human relations, trust and confidence among the workers; and
- (v) to inform the workers about the plans and expectations of the management.

4.4 Factory Manual

A manual is a handbook of rules, policies and procedures of an organization. It describes the general framework of the organization in writing. Likewise, a factory manual is like a guide to the factory organization. It is a compilation of descriptive statements concerning the factory. The factory manual is a written document which describes in detail the following:

- (i) general framework of the factory;
- (ii) flow of authority in the factory;
- (iii) functions, designations and duties of each position;
- (iv) difference between the authority of the line and the staff people in the factory;
- (v) terms used in the line and staff relationships, and
- (vi) relationship of each position to that of its immediate superior and subordinate.

4.4.1 Contents of a Factory Manual

The contents of a factory manual vary widely. Generally, factory manuals contain two important aspects of organizational analysis: (i) position descriptions, and (ii) organization chart.

Position Descriptions : These descriptions clearly define the titles, objectives, functions, specific duties and responsibilities of each position. The descriptions also state the primary interrelationship between the key positions.

Organization Chart : The organization chart shows titles and lines of authority and accountability as on a particular time. Manuals can be drafted on the basis of charts.

In addition to the position descriptions and organization charts, a factory manual contains the following:

(i) *Statement of the Organizations' Objectives and Policies :* Sometimes, an organization manual may describe the actual objectives and policies of the organization. It may, therefore, reflect the efficiency and targets which the organization hopes to receive and its future expansion programmes. In such cases objectives and policies are stated in general terms and not in any particular detail. Thus, a factory manual may state the number of units which the factory should produce in a certain period, and of certain quality or specification.

(ii) *List of Common Duties and Responsibilities :* Manuals contain a list of common duties and responsibilities applicable to all those working in the factory. Common duties and responsibilities are generally regarding: (a) development of subordinates; (b) supervision of subordinates; (c) communication with the superiors and subordinates; and (d) legal and social rules under which the superiors operate with special reference to punishment.

(iii) *Statement of the Generally Accepted Principles of the Organization :* A factory manual sometimes contains material on the generally accepted principles of the factory. These principles for example, may be in regarding to (a) improvement in line and staff relationships; and (b) nature of decision-making and methods of measuring and improving performances, etc.

4.4.2 Preparation of Manual

A manual should be drafted carefully and reviewed from time to time. Generally the manual is prepared by a group of persons who are directly involved with the objectives of the organization. It can be in the book form or loose-leaf form. In the latter case, it is easy to make changes whenever necessary. The manual should be distributed to all persons concerned. Ideally,

everyone in the organization should know the contents of the manual.

4.4.3 Merits of a Manual

It is advisable for any organization or a factory to have a manual because of its merits. The manual has various merits which can be outlined as follows:

(i) It provides a clear channel of communication between various positions.

(ii) It reduces conflict between individuals by clearly indicating the positions in the organization.

(iii) It minimizes the dual authority and responsibility by explaining clearly to whom an individual has to report.

(iv) It is in written form and clearly holds persons responsible for results.

4.5 Organization Chart

An organization chart is a diagrammatic presentation of the structure of an organization as on a particular point of time. Organization charts are used to provide a picture of the organization at a glance. These charts show the various levels on paper. Anybody who visits the

organization, can at a glance know about these levels, their relationship to each other, and what they are expected to do.

4.5.1 Importance of Organization Charts

Organization charts are very important presentations of a summary view of the organization as it has been designed. They tell us the intentions of the designers of the organization. They are a very important part of formalizing the organization. An outsider finds it much easier, at least in a summary way, to understand the structure of even the complex organizations. Most organization structures are very complex and it is very difficult to understand them verbally. Organization charts help in successful integration of various work units within the organization.

The importance of organization charts can be understood from the following:

(i) They let us know the size of the organization.

(ii) They present a formal structure of the organization. Employees and others find it much easier to understand the organization.

(iii) They help us to know the extent to which work in the organization is specialized.

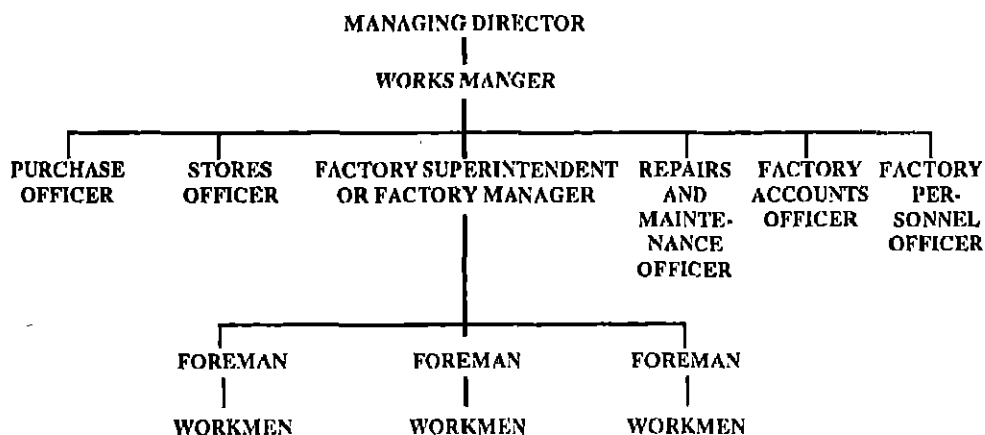


Fig. 4.2 Organization Chart of a Typical Factory

This can be known by reading the labels that indicate different work tasks and their grouping.

(iv) The lines showing the chain of command indicate an important means of coordination.

(v) They help managers to pinpoint organizational defects, for example, duplication of work or possible sources of conflict.

We thus see that individuals in an organization can know duties allotted to them. They can find out where they fit into the structure. They know whom to report and whom to command to get the work done.

4.5.2 Organization Chart of a Typical Factory

We have just noted the organization chart in general. Usually they are drawn for the whole organization. We can then note the position of various activities and departments. We noted earlier that an organization usually has operation departments and service departments. In the case of manufacturing organizations, the operating departments are: (i) factory or production and its allied activities, and (ii) marketing and sales. When we talk of an organization chart in general, we shall diagrammatically show the structure of the whole organization, including the structure of the factory.

It should be noted here that it is difficult to say that all factories or a majority of factories have a particular or specific organization chart. The positions and departmentation depend on the need, size, nature of expertise required, and a

host of other factors. Nevertheless, factories have come to be associated with a certain set of functions. In certain small factories, service departments may be minimum. On the other hand, in a factory belonging to a large, modern and complex organization, the factory structure will be widespread, and so will be its organization chart.

On the basis of the functions largely associated with a factory, the organization chart of a factory can be diagrammatically presented through Fig. 4.2.

We thus notice that this organization chart of a factory has been drawn in vertical form. It can be drawn in a horizontal form thus: the managing director will be shown on the extreme left and the position of factory departmental heads and their subordinates will spread towards the right of him. It could be just another way of presenting the same thing as in the case of the vertical form shown in Fig. 4.2.

In Fig. 4.2, we notice that the chief executive officer of the factory, as also of all other departments of the organization is the managing director. However, he usually delegates all his powers regarding operations to the works manager. The works manager is heading the six departments of the factory, including the actual production. All factory departments are looked after by the concerned officers. In larger plants, these officers may be called managers. In smaller organizations the number of departments in the factory may be less; the chart will show them accordingly.

SUMMARY

1. Meaning of Departmentation

Departmentation is the systematic division of work into small units. The small units are formed by grouping similar activities. The person who is in charge of the department is called the departmental head.

2. Departmentation in Manufacturing Organization

In business organizations, the departmentation is usually done on the basis of functions. There are two categories of functions: primary and derivative. The primary functions are production and marketing. The derivative functions are the supporting functions. The primary functions appear at the first level and derivative functions appear at the second and subsequent levels in the organization. The departments concerned with the physical operations are called operating departments. The departments which provide service or assistance to the operating departments and to the whole organization, are known as the service departments.

3. Benefits of Departmentation

Departmentation helps in promoting efficiency, reduces duplication of work, promotes specialization, and enables the top management to direct, coordinate and control the activities of all the departments.

4. Factory Manager and Functions

The factory manager is the person who manages all the manufacturing activities. He performs the job of directing and guiding his assistants and operators. He is a link between the management and the workers. The main functions of the factory manager are: planning and organizing the work; issuing orders and instructions; motivating workers; maintenance of discipline among the workers; ensuring proper working conditions; providing safety; effective communication; maintenance of records; training workers; and handling grievances.

5. Status, Authority and Responsibility of Factory Manager

The factory manager is vested with executive authority. He makes decisions for initiating action and checking the work while it is done. His responsibility lies in planning and allocation of work, instructing the subordinates, providing them with direct and immediate guidance, and exercising control over their activities and performance. The authority flows from the top to the bottom. As a link between the management and the workers at the operating level, the factory manager possesses the twofold responsibility of satisfying the needs and aspirations of the management and the workers.

6. Factory Manual and Its Contents

The factory manual is a guide to the factory organization. It is a written document which describes in detail the framework of the levels of authority, functions and duties of position, and superior-subordinate relationships.

The factory manual contains: position description, organization chart, statement of policies and objectives, list of common duties applicable to all managers, and statements of the generally accepted principles of the organization.

7. Organization Chart: Its Importance

An organization chart is a diagrammatic presentation of the structure of an organization as on a particular point of time. The importance of organization charts is demonstrated by these points: organization charts help us to know the size of an organization; they present a formal structure of an organization; they tell us the extent of specialization in an organization; they help coordination; and they help managers to pinpoint organizational defects.

8. Organization Chart of a Typical Factory

It is difficult to say that all or a majority of factories are likely to have the same type of organization charts. Nevertheless, there are certain departments and positions which have come to be associated with typical factories. These positions can be shown in the organization chart of a typical factory. In a typical factory, the head of the operating unit, the works manager, reports to the managing director or manager. He usually has under him purchase officer, stores officer, repairs and maintenance officer, factory manager, factory accounts officer and factory personnel officer.

EXERCISES

I. Objective-type Questions

Which of the following statements are right and which are wrong?

1. The primary functions of a factory are purchasing, stores and planning.
2. The factory manager is a person who manages all manufacturing activities.
3. The status, authority and responsibility of a factory manager increase with the increase in the size of an organization.
4. A factory manual is a handbook of the factory's rules, policies and procedures.
5. An organization chart shows the position of trade unions in an organization.

II. Short-Answer-type Questions

1. What do you understand by departmentation?
2. Explain the status of a factory manager.
3. What are the contents of a factory manual?
4. What is the importance of an organization chart?

III. Essay-type Questions

1. Explain the various departments that are found in a factory.
2. Discuss the functions of a factory manager.
3. What is a factory manual? Explain its importance.
4. Draw and explain the organization chart of a typical factory.

CHAPTER 5

Factory Materials and Stores

LEARNING OBJECTIVES

After going through this chapter, you should be able to —

- classify factory materials;
- describe the procedure for procuring materials;
- appreciate the importance of storage and functions of stores;
- explain the methods of storing materials;
- state the meaning and objectives of material control;
- state the meaning of safety stock, ordering levels and ordering quantities;
- state certain basic principles that should be followed while issuing materials from stores;
- describe the procedure of material issue; and
- explain the FIFO and LIFO methods of pricing material issues, and their merits and demerits.

5.1 Introduction

Materials are an important input of production. They usually constitute 50 to 60 per cent of the total product cost in a manufacturing organization. The term 'materials' refers to the items used in a factory for the purpose of manufacturing operations. Since the materials constitute a very high percentage of the total product cost, an organization has to be very careful while evolving procedures for procuring, storing, replenishing and pricing materials.

5.2 Types of Materials

Factory materials can be classified as follows:

(i) *Raw Materials* : Raw materials consist of items which are purchased and processed for converting them into finished products, for example, iron ore, jute, crude oil, leather, etc.

(ii) *Components* : These are the items used for assembling them into finished products. They are of two types : (i) parts purchased in completed

form from vendors, and (ii) parts produced in one's own plant from raw materials, for example, bearings, wheels, etc.

(iii) *Supplies or Indirect Items* : These are used in the manufacturing process but they do not form part of the finished product. Such supplies are usually purchased. They include lubricating oils, waste and wiping rags, office supplies, spare parts for machine, etc.

From the above, it may be noticed that raw materials and components are the direct materials, because they go into the product which is delivered to the customers. 'Supplies' do not form part of the finished product. That is why they are referred to as indirect materials.

Factory materials can be classified from another angle also into (i) factory stores, (ii) work-in-process.

(i) *Factory Stores* : It is a term often synonymously used with materials. But the term 'factory stores' has a wider meaning. It covers not only the raw materials used in the production but also includes other items such as sundry supplies, maintenance stores, fabricated parts, tools, jigs, fixtures and other equipment. Finished and semi-finished products are also included under 'stores'. Generally, 'stores' is also referred to as 'inventory'. Inventory covers the stocks of raw materials, components, work-in-process and finished stock.

(ii) *Work-in-process* : Work-in-process includes materials, parts, sub-assemblies and assemblies which are being processed or assembled into finished products. These are the items which are actually undergoing production operations or are in temporary storage between operations in the manufacturing departments.

Whatever be the basis of classifying factory materials, they ultimately form part of, or contribute to the manufacturing of, or indirectly help in the manufacturing of, the finished product.

Finished products are items carried into stock in completed form, ready for delivery to customers. These are items manufactured by the factory.

5.3 Materials Procurement and Storage

Materials are to be purchased and stored till they are issued to the production and other departments. Purchasing is the procurement of materials and other requirements on payment. Storing refers to the safe custody of materials till they are required for use in the production process. Purchasing and storing are the two important aspects of materials management.

The objective of purchasing is to buy materials of the right quality, of the right quantity, at the right time, at the right price and from the right source and receive their delivery at the right place. As noted earlier, since in any manufacturing organization materials constitute between 50 and 60 per cent of the total cost of production, a small variation in materials cost will affect the profitability of the organization. The amount of work involved in the procurement of materials varies from one organization to another depending upon the size and nature of operations. Since a high percentage of the total cost is spent on materials, it is necessary to lay down formal procedure for procurement and storage of materials.

5.3.1 Procedure for Procurement of Materials

Though the organization for procurement varies depending on the size and nature of the operations, the procedure for buying materials that is followed in medium and large factories is more or less the same. The steps followed in routine buying are as follows:

- (i) Request for purchase of materials.
- (ii) Selection of suppliers for quotations.
- (iii) Inviting tenders and quotations.
- (iv) Placing orders with the supplier.
- (v) Follow-up of purchase orders.

- (vi) Receipt and physical verification of materials.
- (vii) Inspection of materials.
- (viii) Checking and passing the bills for payment.

(i) *Request for Purchase of Materials* : The purchase department on its own does not initiate purchase of materials. A request for initiating the purchasing process could come from: (a) store-keeper for stock replenishment; (b) production department for specific items not regularly stored; or (c) production planning department for new production development.

The request for the purchase of materials is made on a form called 'Purchase Requisition'. This form provides information about the type and quantity of materials to be purchased, as also the time at which they are needed. The Purchase Requisition Form is prepared in triplicate. One copy of it is retained in the indenting department for office record. Two copies are sent to the purchase department, where one copy is retained and the other copy is sent back to the indenting department after noting the details in the requisition form. This noting serves the purpose of confirmation that action on the requisition is being taken.

(ii) *Selecting Suppliers for Quotation* : The purchase department usually maintains a list of the names and addresses of suppliers for every group of materials. While selecting a supplier, the purchase department should consider: (a) manufacturing capacities; (b) reliability; (c) financial conditions; (d) management of the supplying firm; (e) price quoted; (f) quantity for which price quoted is applicable; (g) terms of delivery and payment; and (h) the specification to which the products are manufactured and all other related factors. The purchase manager obtains necessary information from the schedule of quotations, past records, catalogue, buyers' guides and other books. Quotations may be obtained from some of the suppliers and then an order can be made to one or some of them, depending upon the situation.

(iii) *Inviting Tenders and Quotations* : In case the above-mentioned step is not followed, some organizations prefer to invite tenders. Invitations for tender on a prescribed form are addressed to the prospective suppliers requesting them to submit tenders. Tenders are the offers from prospective suppliers to supply the materials. They contain the price at which the supplier is ready to supply. They also contain the conditions subject to which the price mentioned in the tender has been quoted.

Tenders are received in sealed covers by the due date. They are opened on the stipulated time. The details given in tenders are summarized and tabulated in a comparative statement so as to know the most suitable of them.

This comparative statement is scrutinized for important details like price, quantity, reliability of each supplier, terms of delivery and terms of payment contained in each tender.

(iv) *Placing the Order* : After selecting the suppliers, a purchase order is placed. The content of the purchase order should be complete and definite regarding full details of supplies. Each purchase order is serially numbered and contains the date of issue. The suppliers refer to this number and date in their future correspondence. Four copies of the purchase order are prepared for distribution: one copy is sent to the supplier, one to the receiving department, the third copy is sent to the accounts department, and the fourth is retained for office records.

(v) *Follow-up of Purchase Orders* : The follow-up is meant to ensure that the supplies are delivered on the due date. Enquiries are made at regular intervals to know the suppliers' difficulties. If any delays are expected, suitable remedial measures can be taken. If the supplier expresses his inability to supply the materials ordered, alternative arrangements can be made. Thus, the follow-up action protects against the hold-up in production due to the non-receipt of materials on time.

(vi) *Receipt and Physical Verification of Materials* : The receiving department receives

the materials from the suppliers. The materials generally are received along with the following documents: (i) advice of despatch (which is sent by the supplier informing the despatch of materials from his place), and (ii) delivery note (which is received from the carrier who has transported and delivered the materials).

The materials received are checked with reference to the purchase order. The receiving department verifies the quantity received with the quantity ordered. Discrepancy, if any, is noted and brought to the notice of the supplier. A Materials-received Note is prepared to enter the details of the materials received and the Certificate of Inspection is endorsed on it.

Four copies of the Materials-received Note are prepared. One copy is sent to the purchase department, second to the stores, third to the accounts department for payment and the fourth is retained in the department.

(vii) *Inspection of Materials* : After physical

verification, the materials are sent to the inspection department to check the quality of materials. This is to ensure that the quality of materials is according to the purchase order. After checking the quality, the inspection department submits a report as to the quality, and if the materials are rejected, the reasons thereof will also be stated in the report.

(viii) *Checking and Passing Bills for Final Payment* : After the despatch of materials, the supplier sends an invoice, which contains details of the materials supplied and the amount to be paid. The purchase department verifies the invoice with (a) the purchase order; (b) the materials-received note; (c) the inspection report; and (d) the materials-returned note, if any. If, on verification, the invoice is found correct, it is passed on to the accounts department for payment.

The procedure for procurement of materials is shown in Fig. 5.1.

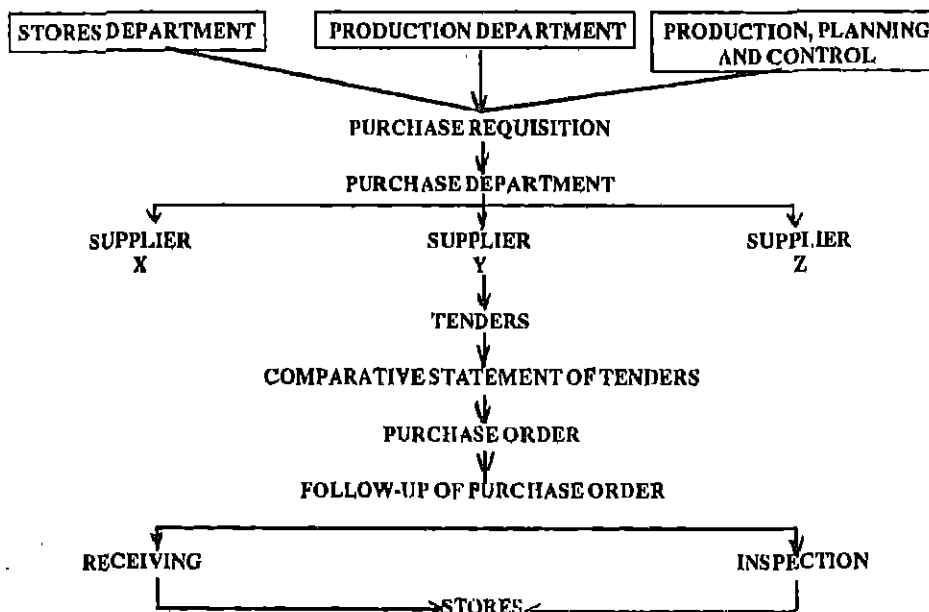


Fig. 5.1 Materials Procurement Procedure

5.3.2 Storage

The materials procured should be stored till they are issued to the production and other departments for use. After inspection, the purchased materials are sent to the stores for safe custody. If the materials are meant for stocking purposes, they are taken to the store, and if they are non-stocking materials, they are directly taken to the production or assembly lines after inspection. Storage is another important aspect of materials management.

A store is the place or building where materials are kept. Storage is the act of storing materials. 'Stores' and 'storage' are synonymously used because 'stores' covers all aspects of the protection and preservation of materials, i.e., place, supplies and storing. Storage, therefore, involves supervision, receiving, storing and issuing of materials. In brief, it is the physical handling and the safe custody of materials. Two alternative methods of location of stores are available. Either of these is adopted. They are: (i) the stores department may be located in the centre of the plant so that it may supply materials to all consuming departments; or (ii) a stores department may be attached to each production department. Thus, we note that storage may be centralized, as in the former case, or decentralized as in the latter case.

5.3.3 Importance of Storage

Storage, as we have just noted, would be the safe protection of materials, component parts, supplies, tools and other equipment. *The emphasis here is on the storing of incoming materials.* The main purpose of storage is to provide service to the operating functions. All other stores activities are subsidiary to this main purpose. The importance of storage can be noted from the following:

(i) Raw materials are continually made available when required in the required quantities.

(ii) Handling of materials is made easy through proper stores.

(iii) Delays and confusion are minimized in the issue of materials.

(iv) Records are maintained and continual verification is made with the book stock.

(v) Various levels of stock are properly maintained thereby avoiding excess stocks, which leads to the blocking up of the working capital.

(vi) Proper evaluation is made of wastage, deterioration, depreciation and shrinkage in different kinds of materials. This helps in the determination of the quantity of each material to be stored and the type of storage required.

(vii) Movement of stock, like slow-moving, non-moving and obsolete items, is noted. This helps the management to do away with the non-moving and obsolete stocks and in the utilization of the existing items for production purpose.

5.3.4 Functions of Stores

To achieve the objectives listed above several functions are to be performed by stores. They may be stated as follows:

(i) To receive raw materials and account for them.

(ii) To provide adequate and proper storage for every item or material.

(iii) To keep the materials in good condition to avoid pilferage, wastage and deterioration.

(iv) To issue materials against proper requisitions.

(v) To bring to the notice of the management discrepancies and abnormalities and suggest control measures.

(vi) To maintain good house-keeping to facilitate easy handling of materials.

(vii) To assist in regular and periodical checking.

(viii) To check from time to time measuring equipment like balances, scales, etc. for their accuracy.

5.3.5 Store-keeper

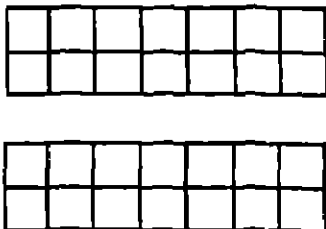
Supervision is an important aspect of stores or store-keeping. The stores department is under the supervision and control of the store-keeper. He is in charge of the department, and may also be referred to as the Stores Manager. Status-wise, the store-keeper may not occupy the same position as the purchase manager in the organization, but the functions and responsibilities he shoulders are significant. He is responsible for the receipt, storage and issue of materials. He receives all the incoming materials, preserves them carefully, keeps them in good condition, maintains their continual supply, protects them against pilferage, deterioration, wastage and other losses, and continually endeavours to minimize the storage cost.

Since the functions and responsibilities of the store-keeper are significant in the organization, a person with necessary technical knowledge and competence in organizing the operations of the stores should be appointed as the store-keeper.

5.3.6 Methods of Storing Materials

For effective storage, it is important to select a suitable method of storing materials. There are

ROW STACKING



Aisle saving by suitable positioning of pallets.

The above arrangement requires more aisle space.

Fig. 5.2 Row Stacking

three methods of storing materials: fixed-position, random-position, and zoned-position methods.

(i) *Fixed-position Method* : Under this method, the materials of a particular type have a position exclusively allotted to them. This helps to take out the materials from stores without any difficulty regarding its position. But under this methods, there will be considerable waste of place, because it may be difficult to fill the vacant place.

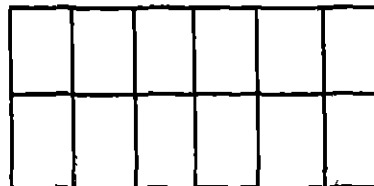
Fixed position to a specific type of materials may be made on any of the following bases:

- (a) Supplier;
- (b) Similarity of items;
- (c) Joint issue of items; or
- (d) The size and frequency of the use.

(ii) *Random-position Method* : Under this method, the materials can be stored in any position. This method helps in better utilization of the available space. But this methods may not be suitable where there are a number of product lines. A record of every product line has to be kept, about where the materials are and the frequency at which they enter the storage area.

(iii) *Zoned-position Method* : Under this method, the materials of a particular product group are kept in a given area. They may be random-positioned or fixed-positioned.

BLOCK STACKING



Above arrangement requires less aisle space.

Fig. 5.3 Block Stacking

Piling or Stacking

After a decision on the methods of storage has been taken, an important question arises as to how to keep the materials at the storing place.

The materials may be piled or stacked. They may be placed directly on the floor in the cubical or pyramidal form. Stacking height depends on the floor-load capacity, the crushability of materials, floor-ceiling height, and the speed lifting capacity of the equipment to be used.

Depending on the quantity of materials to be stored, 'block-stacking' or 'row-stacking' is used. Block-stacking is the stacking of pallets or containers in rows in such a way that each row contacts the adjacent row. Where large quantities of materials are to be stacked, block-stacking is most suitable. Row-stacking is the stacking of materials in rows with sufficient space between rows, so that any row of pallet stacks can be easily withdrawn. Row-stacking is more flexible than block-stacking but requires more aisle space.

5.4 Materials Control

Materials is the most important input of production. It should be purchased, stored and issued in a systematic way. Otherwise, it will affect the profitability of the organization in the form of heavy material costs. The term 'materials control' is also referred to as 'inventory control'. Materials control consists of (i) control of procurement of materials, (ii) storing them till required, and (iii) issuing materials for consumption in the manufacturing process. Procuring and storing are concerned with the physical control. There are many physical controls on materials to prevent deterioration, wastage and theft. But physical control alone is not sufficient to reduce costs. It is also necessary to have control on money invested.

5.4.1 Objectives of Materials Control

One of the major functions in a factory organization is to provide materials to the production department in proper quantities when

they are needed. Unless this is done, men and machinery will be idle and customers' orders will not be met on time. So, it is necessary to give top priority to this function. The objectives of materials control can be outlined as follows:

(i) To minimize the blocking of working capital in inventories. Since inventories carry costs and obsolescence loss, efforts should be made to minimize investment in them.

(ii) To control and reduce the overstocking of materials, work-in-process and finished goods.

(iii) To protect the materials from spoilage, pilferage, wastage, loss and misappropriation.

(iv) To maintain records for all items of materials so that information may be available at any time and for any purpose.

(v) To reduce the idle time caused by shortage of materials and non-availability of materials as per requirements.

(vi) To utilize the standard form and procedure in purchasing and issuing materials.

(vii) To take corrective action for deviations through feed-back.

5.4.2 Meaning of Safety Stock, Ordering Levels and Ordering Quantities

One of the steps taken for materials control is setting stock levels. Normally the following levels are set in this regard:

- (i) Ordering level
- (ii) Minimum level
- (iii) Maximum level
- (iv) Danger level

Ordering Level : The ordering level is the level of stock at which action for replenishment of stock is taken. This is an indication for initiation of the purchase procedure. Ordering level is fixed between the minimum and maximum levels. It can be calculated as follows:

Ordering level = Minimum level + consumption during the time required for fresh delivery

Minimum Level : This level indicates the minimum quantity of materials normally

maintained at all times. This level is fixed with the objective that production is not held up due to shortage of materials. This is also known as 'safety stock' or 'buffer stock'.

Maximum Level : The maximum level indicates the maximum quantity of the item of materials which can be held in stock at any time. This level also indicates the maximum quantity above which stocks are usually not allowed to exceed. If the stocks exceed this level, unnecessary funds would remain locked up in the working capital, which may become short in course of time. This will affect the profitability of the organization. It is important to note that this level should be fixed carefully.

Danger Level: It indicates the level at which the issue of materials is stopped and issues are made only under specific instructions. Immediate steps must be taken to procure materials at any cost, even if they are to be air-lifted. The movement of the stock between stock levels is shown through Figs. 5.4 and 5.5.

Ordering Quantity : Once the stock reaches the ordering level, the purchase manager places an order with the suppliers and the size of the order is normally the economic order quantity. This is the quantity which should be ordered at a time so that investment in materials is the minimum while the production should be kept going. The economic order quantity should be used for those materials which are costly and the procurement of which is not difficult.

5.4.3 Issue and Replenishment of Materials

Issuing materials is a very important aspect of materials control. Materials are to be issued from the stores to the consumption centres. While issuing the materials from stores, certain basic principles should be followed. These principles are as follows:

- (i) Refer to the bill of materials for the quantity of items of materials required.
- (ii) The stores department should not make two issues at the same time.

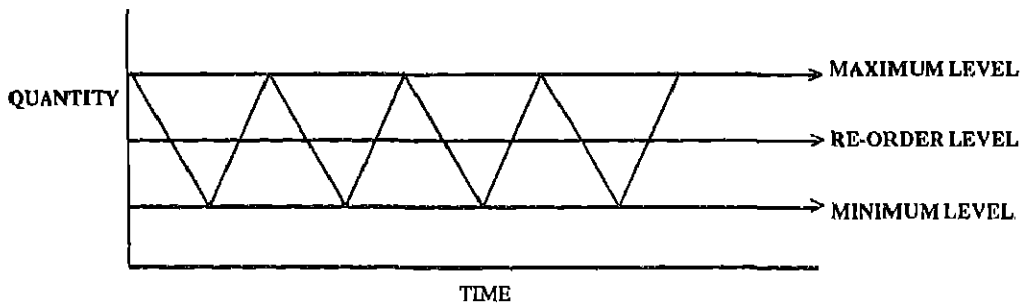


Fig. 5.4 Regular Movement of Stock with Strict Adherence to Levels

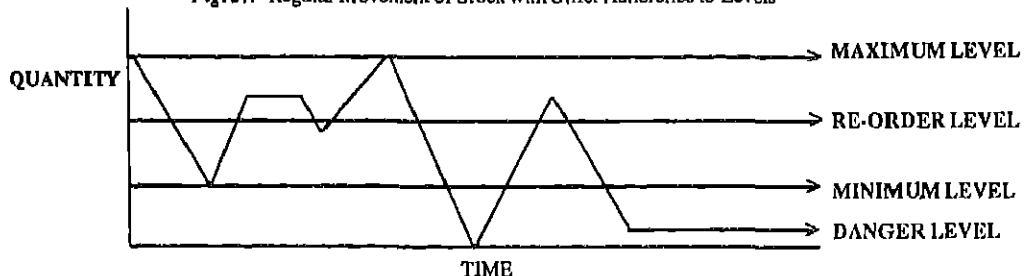


Fig. 5.5 Irregular Movement of Stock Without Adherence to Levels

(iii) Periodical requirements should be fixed in advance.

(iv) The internal audit department should exercise continual check on the withdrawal of materials.

(v) While issuing materials, wastage should be checked minutely.

5.4.4 Material Requisition

The stores department should not issue materials from the stores without a proper written authority. Request for the issue of materials should be made to the store-keeper on the prescribed form and be signed by a competent authority.

The document which authorizes and records the issue of materials is 'Materials Requisition Note'. The contents of the Material Requisition Note are:

- (i) Number and date of the requisition.
- (ii) Department requesting.
- (iii) Particulars and code of materials.
- (iv) Quantity demanded and unit cost.
- (v) Authority for requisition.
- (vi) Signature of the person placing the requisition.

On receipt of the material requisition, the store-keeper verifies it with the relevant bills of materials to check up whether the said materials has been sanctioned to the said department against the job. If the sanction has been accorded, the material is issued; otherwise, the requisition note is returned to the planning department for necessary action.

Generally, three copies of the material requisition are prepared: two copies are sent to the stores department for facilitating the issue of materials and one copy is retained by the indenting department as the office copy. After issuing the materials, the store-keeper allots a serial number in both the copies and enters the bin/ledger folio number. One copy is retained in the stores for reference and the other copy is passed on to the cost office for pricing and store accounting.

Any material left unused in any department after the completion of a job should be returned to the stores through 'Material Returned Note'. Three copies of the return note are prepared. One copy is sent to the stores, the second copy is sent to the cost office, and the third copy is retained in the department which is returning the surplus material.

Transfer of materials from one department to the other should not be permitted. It should be done only through the stores with the preparation of the Materials Transfer Note. Three copies of the Material Transfer Note are prepared. One copy should be sent to the stores, another copy should be sent to the cost office, and the last copy should be retained as the office copy.

5.4.5 Material Issue Procedure

When materials are reserved in advance of production, the planning section sends the bill of materials for a production order to the materials control section or the stores accounting section for the apportionment of materials in the stores ledger. The entries in the stores ledger for apportionment are the following:

- (i) Quantity to be posted in the apportioned column.
- (ii) Apportioned balance is increased by the quantity reserved.
- (iii) The existing balance is reduced.

After recording the above in the stores ledger, three copies of the material requisition slip are sent to the central despatching office from which they are sent to the production department where they are required. When the job is about to be started, the local dispatcher of the production department (or foreman if there is no despatcher) takes out one copy of material requisition slip and sends them with a movement to the store-room. The moveman and store-keeper sign the material requisition. Then, the materials are issued to the moveman who taken them to the production department.

The store-keeper posts the issue and indicates the new balance of materials on the bin card. The store-keeper retains one copy of the material requisition and sends the other two to the stores accounting section or the materials control room, as the case may be. This procedure is applicable to raw materials, purchased parts and sub-assemblies which are stored. Supply orders for withdrawal of finished products from the stock for delivery to customers are treated according to a similar plan.

5.5 Pricing of Material Issues

Materials are to be issued to the departments when requisitions are sent to the stores. Various lots are purchased at different prices and stored till they are issued. The problem is which of the purchase prices should be adopted for valuing the material issues. There are various methods available for pricing of material issues.

Selection of a proper method depends on the nature of business, type of costing system, frequency of receipts and issue transactions, fluctuations in the purchase price, and the degree of accuracy required. Most commonly used methods for pricing material issues are First-in-First Out and Last-in-First Out methods.

5.5.1 First-in-First Out (FIFO) Method

In the First-in-First Out method, issues are priced on the basis of the oldest lot currently in storage. The price of the first lot is taken for the issue when requisitions are made. As and when the quantity of the first lot is exhausted, the price of the next lot is adopted.

Merits

Pricing the material issues on the basis of the First-in-First Out method has the following merits:

- (i) Chronology is maintained.
- (ii) The FIFO method is simple to understand and can be easily adopted in the pricing of material issues.

(iii) The value of the stock at the end is at the current market price.

(iv) This method is suitable when bulky materials with high unit prices are to be used.

Demerits

(i) Under the FIFO method, calculations become unwieldy when materials are received very frequently at different prices.

(ii) For pricing one material requisition, more than one price may have to be considered.

(iii) Closing stock value does not reflect the real picture for accounting purpose.

(iv) In a situation of rising prices, this method will not reflect the correct cost of materials.

5.5.2 Last-in-First Out (LIFO) Method

In Last-in-First Out method, the material issues are priced in the reverse order of purchase. The price of the latest material purchased is adopted first when materials are issued. Subsequent items will then be priced according to the last lot received. This method is suitable in a situation of rising prices because materials are valued at the price of the latest available consignment in the stores, which is closely related to the current price level. This will help the management in fixing the competitive selling prices of the products. This method is also known as the Replacement Cost method.

Merits

The merits of the LIFO method may be outlined as follows:

(i) This method is simple to understand and easy to operate when the material transactions are not many.

(ii) The LIFO method is most suitable for perishable and bulky materials with high unit prices.

Demerits

Demerits of the LIFO method can be stated as follows:

- (i) As in the FIFO method, calculations under the LIFO method are very difficult when receipts of the materials are too many.

- (ii) Sometimes more than one price is to be adopted for a single issue.

- (iii) If this method is used, there is a risk of obsolescence of the material.

An example is given here to demonstrate the actual consequence of using either the FIFO or the LIFO method for pricing issues.

Illustration

Tabular Form of 'X' Co. of Pricing Items under FIFO and LIFO Methods

Discuss the effects of FIFO and LIFO on profits with the help of the following:

Jan. 1, 1992 Opening balance — 10 units @ Rs 30 each

10, 1992 Purchased — 10 Units @ Rs 33 each

12, 1992 Issued — 10 units

31, 1992 Closing balance — 10 units

Feb. 3, 1992 Purchased — 10 units @ Rs 36 each

12, 1992 Issued — 10 units

28, 1992 Purchased — 10 units @ Rs 40 each

Sales during these two months amounted to Rs 1000.

Stores Ledger Account

(Following FIFO Method of Pricing Issues)

Date	Receipts			Issues			Balance		
	Qty.	Rate per unit	Amt. Rs	Qty.	Rate per unit	Amt. Rs	Qty.	Rate per unit	Amt. Rs
Jan. 1	-	-	-	-	-	-	10	30	300
10	10	33	330	-	-	-	10	33	330
							20 10	30	630 300
12	-	-	-	10	30	300	10	33	330
Feb. 3	10	36	360	-	-	-	10	33	330
							20 10	36	690 360
12	-	-	-	10	33	330	10	36	360
							10	36	360
28	10	40	400	-	-	-	20 10	40	760 400

Stores Ledger Account
(Following LIFO Method of Pricing Issues)

Date	Receipts			Issues			Balance		
	Qty.	Rate per unit	Amt. Rs	Qty.	Rate per unit	Amt. Rs	Qty.	Rate per unit	Amt. Rs
Jan. 1	-	-	-	-	-	-	10	30	300
10	10	33	330	-	-	-	10	30	300
							20	10	33
									630 330
12	-	-	-	10	33	330	10	30	300
Feb. 3	10	36	360	-	-	-	20	10	30
							10	36	660 360
12	-	-	-	10	36	360	10	30	300
							20	10	30
28	10	40	400	-	-	-	10	40	700 400

Comparative Statement of Profit

	Under FIFO Method	Under LIFO Method
Opening stock	300	300
(Add) Purchased Jan. 10 10 units @ 33 = 330 Feb. 3 10 units @ 36 = 360 Feb. 28 10 units @ 40 = 400		
	1090	1090
	1390	1390
(Less) Closing stock (as shown in Stores ledger a/c) 790	790	
Charge to cost of sales profit	630	690
	370	310
Sales	1000	1000

From the above, we see that the profit under the LIFO method is Rs 60 less as compared to that which is arrived at on following the LIFO method of pricing the issues. It is because charge to cost of sales under the LIFO method has been made at the current market prices, which are

high in the present case. We note that 10 units of the closing stock have been valued at a price of Rs 30 per unit, which does not reflect the current market price of Rs 40.

While understanding the pricing of the material issues, it is important to note that these

methods have no relationship with the physical arrangement of storing materials. Both the FIFO and LIFO methods are based only on assumptions about the flow of materials. In actual price there

is no actual physical movement of materials as per assumptions. Both these methods of accounting only attempt to show the cost of inventories in a consistent manner.

SUMMARY

1. Factory Materials and Stores: The Term

'Materials' refers to the commodities supplied to a factory for the purpose of consumption in the production operations. Materials are grouped on the basis of nature, condition, and usage. There are five classes of materials, raw materials, component parts, supplies, work-in-process, and finished products. Except supplies, all the classes are called direct materials; and supplies are indirect material. From another angle, factory materials can be classified into (i) factory stores, and (ii) work-in-process.

2. Materials Procurement and Storage

Procurement means not only purchasing but acquisition of other supplies. Purchasing is an important function of materials management. The main purpose of purchasing is to see that continual supply of raw materials is maintained and the production cost of finished product is reduced. For achieving the objectives of purchasing, the parameters are right price, right quality, right time, right source, and right quantity. 'Storage' refers to the act of storing materials for their safe custody till they are required for their use in the production process.

3. Procedure for Procurement of Raw Materials

Since large amounts of money are spent on procurement of raw materials, formal procedure should be followed in a systematic manner. The procedure in general consists of the following steps:

- (i) Request for purchase of material.
- (ii) Selection of a supplier.
- (iii) Inviting tenders and quotations.
- (iv) Placing of orders on suppliers.
- (v) Follow-up of purchase orders.
- (vi) Receipt of stores and return to suppliers, if necessary.
- (vii) Inspection of stores.
- (viii) Passing the bills for final payment.

4. Storage and Its Importance

Materials received are to be kept in the stores. 'Storage' means protection of materials against hazardous conditions, weather, deterioration, dust, and theft. Each kind of material requires different type of protection. 'Stores' and 'storage' are synonymously used. This involves supervision, receiving, storing, and issuing of materials. Storage helps in continual availability of raw materials, easy handling of materials, minimizing confusion, continual verification of stocks, proper maintenance of various stocks and proper determination of quantity of each material.

5. Methods of Storing Materials

There are three methods of storing materials: (i) fixed-position methods, (ii) random-position method, and (iii) zoned-position method. In the case of the fixed-position method, the materials of a particular type have a position exclusively allotted to them. Under the random-position method, the material can be stored in any position. In the case of zoned-position method, the materials of a particular product group are kept in a given area. Under all these methods, materials can be piled or stacked. Stacking can be either row stacking or block stacking.

6. Material Control

'Materials controls' is concerned with purchasing, storing, and issuing of materials. There are several basic decisions involved in establishing materials control, viz. grouping of materials into classes, deciding the department responsible for each class of material, planning the requirement of materials with respect to the production policy, and introducing stock level and control methods according to the value of materials used.

7. Meaning of Safety Stock, Ordering Levels and Ordering Quantities

For effective materials control, various ordering levels and ordering quantities are fixed. The stock levels and quantities fixed serve as guides for taking action on time so that the quantity of each item of material is controlled. Ordering level is the level of stock at which action for replenishment is needed. Minimum level is the minimum quantity of material which must be maintained at all times. This level is also known as 'safety stock or buffer stock'. Maximum level is the maximum quantity of materials which can be held in stock at any time. Ordering quantity is one which should be ordered at a time so that investment in materials is the minimum while the production should be kept going. By fixing ordering quantities, the management tries to solve the inventory problems of how much to purchase and how often to purchase.

8. Procedure of Issue of Materials

When requisitioned materials are issued, the basic principles which should be followed are: (i) planning material requirement, (ii) requisitioning of materials, (iii) issue of sundry materials, (iv) internal audit of issues, and (v) control of wastage.

The stores department should issue materials only when there is proper written authority, i.e., through material requisition note. The store-keeper should verify the material requisition note with the relevant bill of materials. Any material left unused should be returned to stores through the 'materials returned note'. Transfer from one department to another should not be permitted. It should be done through stores with the preparation of the 'material transfer note'.

9. Pricing of Material Issues

There are various methods for pricing issues of materials. The commonly used methods are First-in-First Out (FIFO) and Last-in-First Out (LIFO) methods. Under FIFO, the price of the oldest lot is taken first and under LIFO the price of the latest lot received is taken first for the purpose of pricing the issue of materials.

Selection of a proper method depends on the nature of business, type of costing system, frequency of receipts and issue of materials, fluctuations in the purchase price, degree of accuracy required, and the nature of durability of material to be handled.

EXERCISES**I. Objective-type Questions**

Fill in the blanks:

1. The request for purchase is made on _____ form.
2. To record the materials received, the document used is known as _____.
3. The stock of materials to be maintained at all times is _____.
4. The danger level means _____.
5. The Bill of Materials is prepared by the _____ Department.
6. The method in which the latest price is adopted for the pricing of material issues is called _____.
7. Storage means _____.
8. Materials control consists of _____.

II. Short-Answer-type Questions

1. What is meant by 'supplies'?
2. What is meant by the term 'factory stores'?
3. What information is provided in the purchase requisition?
4. How is a supplier for placing order selected?
5. State the importance of storage.
6. What is the fixed-position method of storing?
7. State the meaning of the term 'materials control'.
8. Explain the minimum and maximum levels of stocks.
9. What is an economic order quantity?
10. What is danger level?
11. What are the functions of a store-keeper?
12. What are the objectives of materials control?

III. Essay-type Questions

1. Describe the procedure for procuring materials.
2. Discuss the methods of storing materials.
3. How are the ordering levels and ordering quantities of stock decided?
4. Describe the procedure for issuing materials.
5. Discuss the FIFO method of pricing materials with a suitable example. What are its merits and demerits?
6. Explain the merits and demerits of the LIFO method of pricing materials.

CHAPTER 6

Factory Labour

LEARNING OBJECTIVES

After going through this chapter, you should be able to —

- define ‘workman’;
- differentiate between skilled, semi-skilled, and unskilled workers, and casual and regular workers;
- state the meaning and sources of recruitment of factory labour;
- explain the importance of direct recruitment through an employment exchange;
- differentiate between time-rate method and piece-rate method of wage payment;
- state the law relating to age, hours of work, holidays and leave under the Factories Act;
- explain the difference between holidays and leave; and
- state the law relating to minimum wages.

6.1 Introduction

All organizations need resources to function. Factories need resources in the form of man, money, materials, and machines. Employees, including workmen, have lately come to be known as human resources of an organization. Their role is very crucial for the success of an organization. So important are human resources that attempts are being made at the global level to treat costs incurred on manpower as assets rather than expenses. This thinking also stresses the fact that human resources have unlimited potential capabilities. An organization must, therefore, care-

fully plan for the recruitment, acquisition, compensation, preservation and development of its human resources. New devices are coming up in the area of management technology to face the new challenges created by this new thinking.

In this context, this chapter attempts to explain certain concepts and issues in the area of management of personnel or human resources of an organization.

6.2 Workman : Meaning

Simply speaking, a workman is a person employed by an employer to work for him in return

for remuneration. The relationship of employer and workman, or master and servant, is essential in order to treat a person a workman. This relationship arises from an agreement between them, legally known as contract. Such a contract need not be made in writing, and can be an oral understanding between the employer and the workman. The agreement specifies the terms on which the workman agrees to work for his employer. It may include the place and timings where the work is to be done. It also provides for wages, rights, duties, responsibilities involved, etc., of the workman.

If we look to various labour laws, we notice that all laws stress that in order to be a workman a person should (i) enter into a contract of employment, and (ii) accept the right of the employer to give him direction. Interestingly, under these laws, for example the Industrial Disputes Act 1947, a workman may do any type of work—skilled, unskilled, clerical, technical, operational, or supervisory. However, those doing managerial and administrative work are excluded from the definition of a workman. The work may be done on hire or reward, i.e., on the basis of a time wage or a commission. Also, a domestic servant is not a workman. A workman should be employed in an industry (which includes factories as well). We may thus say that “a workman is a person employed in industry to do any skilled, unskilled, or technical work in return for remuneration”.

When we talk of a workman, it is essential to distinguish him from an independent contractor. A contractor is one who agrees to do some work for another not under an agreement of “employment” but independent of it. A workman works under the control and supervision of his employer. A contractor does not do so. Therefore, when A gives to B some tobacco and leaves to roll *bidis* in return for a certain rate of remuneration at his (B's) house and supply them back to A, B is a contractor and not a workman. On the other hand, if B comes to work at A's premises where he rolls *bidis* of certain specifications

for remuneration, under the supervision and control of A or any of his representatives, then B is a workman.

6.3 Different Types of Workers

We have just seen that workmen could be employed in various types of work. On the basis of work done, we may list the following types of workman:

(i) *Unskilled Workers* : An unskilled worker is one who need not acquire any skill, by training or otherwise, to perform his work. He performs work which, by and large any normal person can do. Some of the examples of unskilled workers are loaders and unloaders of materials, peons, sweepers, helpers, etc.

(ii) *Skilled Workers* : A skilled worker is one who has acquired some skill to do his work. Such skill may be developed by education, training, practice, or experience.

A skilled work cannot be done by any worker who has not acquired skill by any of the above-mentioned means. A skilled workman makes frequent use of his brains, apart from his physical labour. For example, masons, carpenters, iron-smiths, mechanics are skilled workers.

(iii) *Semi-skilled Workers* : Certain jobs require a relatively low degree of skill. They are supposed to be performed by semi-skilled workers. In a semi-skilled job, the use of brains is comparatively much less frequent than in a skilled or highly skilled job. In fact, the distinction between a skilled and a semi-skilled workman is only one of the level or degree of skill which he has to practise. Some of the examples of semi-skilled workers are: welders, drill operators, spray painters, etc.

Distinction between Skilled and Unskilled Workers

With the help of the meanings stated above, we may distinguish between a skilled and an unskilled worker as under:

(i) *Acquisition of Skill* : A skilled worker has to acquire a special skill. He need not necessarily do so by studying a course in an educational or training institution. He may do so by training, or just by practising for a sufficiently long time. For example, a person who learns driving can be said to be skilled only when he has learnt the art of driving and not while he is still practising. An unskilled worker performs routine task which does not require acquisition of any skill. He can start doing his work right from the first day or after minor understanding of the procedure.

(ii) *Application of Brains* : A skilled worker frequently uses his brain while performing his work. He has to carefully distinguish between the desirable and the undesirable acts that relate to the performance of his work. He should also know how to make use of his skill in adverse or emergency situations. Since the nature of work of an unskilled worker is routine or mechanical, the use of brains in the performance of work by an unskilled worker is much less.

(iii) *Technical Knowledge* : A skilled worker often, though not always, has technical knowledge about his work. Such technical knowledge again need not be acquired by any technical education but can be practised. Technical knowledge involves special mental training or scientific knowledge of a person. An engine driver, for example, has technical knowledge about his work. In the case of an unskilled worker, technical knowledge is never required. His work is more of a routine or mechanical nature.

(iv) *Price of Work* : A skilled worker is usually paid a higher price (wage) for his work than an unskilled worker. This may be due to the level of efforts involved and also due to the fact that the supply of skilled workforce is comparatively scarce.

6.4 Casual and Regular Worker : Distinction

Workers may be employed on a regular or casual basis. Regular workers are also known as permanent workers. A regular worker becomes a per-

manent part of the organization subject to the terms and conditions applicable to such workers. He cannot be removed from service at the will of the employer. A casual worker works subject to the availability of work with the employer and cannot demand work as a matter of right. We may note the following points of distinction between the two:

(i) *Nature of Contract* : A regular worker is deemed to have entered into a long-term contract of work, say till his retirement or voluntary retirement. The contract entered into by a casual worker is short-term, say, involving a day, or a few days, or a few months.

(ii) *Nature or Rights* : A regular worker enjoys a number of legal rights whereas the rights of casual workers are few and narrow in scope. For example, a regular worker cannot be removed except through proper procedure of law. A regular worker is entitled to various social security, welfare, and compensation (including bonus) benefits, which could be conferred by law or an agreement. Casual workers have only few of these rights, depending upon the number of days for which they have worked. For example, a casual worker is not entitled to be placed in a regular pay scale, but he is entitled to the provident fund benefits after fulfilment of certain conditions.

(iii) *Annual Increments* : In case a regular worker is employed on the time-rate basis, he usually gets an annual increment of pay. Casual workers do not get such a benefit. Regular workers are usually placed in various scales of pay, if paid on the time-rate basis. Casual workers are usually paid on daily wage basis.

6.5 Recruitment of Factory Workers

An important aspect of human resource planning is first to identify the number of people required for various positions in an organization. The organization then has to initiate efforts to lay down the types and characteristics of persons to be selected. This calls for the determination of qualifications of people to be selected. On the

basis of these specifications, a recruitment programme is then chalked out.

6.5.1 *Nature of Recruitment*

Recruitment may be defined as the process of identifying, stimulating, and encouraging prospective employees to make application for a particular job in an organization. The purpose of recruitment is to invite or make a large number of eligible persons to offer themselves for selection. This is done with a view to selecting the best possible talent for the organization. For this, it is essential to use an effective device to bring the information about vacancies to the prospective job-seekers.

The main objective of recruitment is to increase the number of applicants for a particular job. Managers should appreciate that the acquisition of suitable employees is perhaps the most important and complex task for their organization. Since competent and trained personnel are usually in short supply, recruitment is acquiring greater importance. It is realized that no single set of sources of recruitment will work for every situation. We must, therefore, examine the various recruitment sources available to modern management.

6.5.2 *Sources of Recruitment*

Basically, the sources of recruitment can be divided into two: (i) internal, and (ii) external.

By internal sources we generally refer to the personnel who are already working in the organization. It also includes ex-employees who plan to return, or whom the organization would like to rehire. Many organizations prefer this policy of recruitment. Whenever a vacancy arises, efforts are made to transfer or promote somebody from within the organization. For example, in Hindustan Lever Ltd. and Tata Engineering and Locomotive Company Ltd. (TELCO), outside recruitment is resorted to only in case the requirement cannot be met internally. A policy of

recruitment through internal sources enhances the morale of the existing employees. This policy also provides the company with a more reliable information about the competency, suitability and skill-level of its own employees who have worked on lower posts. The major weakness of this source, however, is that it discourages the organization to have a fresh outlook, originality, and initiative. Outsiders sometimes bring these qualities with them. These qualities are becoming increasingly important to meet the challenges posed by new technologies and the changing business environment.

External recruitment refers to those sources which lie outside the organization. These include people who work in other organization and want better opportunities by moving out of them, as also fresh talent seeking jobs. The external source is important because few organizations can fill all their human resource requirements from within. Most organizations rely on internal as well as external sources of recruitment.

The internal and external sources of recruitment of the factory labour are shown in Fig. 6.1.

Internal Sources

(i) *Promotions* : Promotion is a device to retain and reward employees for their service to the organization. A sound promotion policy builds up loyalty, morale and a sense of belonging in an employee towards his organization. A promotion generally involves a change of job, improvement in status, and salary, and responsibility. A good promotion policy impresses upon others that opportunities are open to them also in the organization if they reach the expected level of performance.

(ii) *Transfers* : A transfer is a change in job assignment, which may involve a promotion or no change in the responsibility and status. Such movements of employees within an organization are usual phenomena. Shifting of employees is necessitated owing to expansion of business,

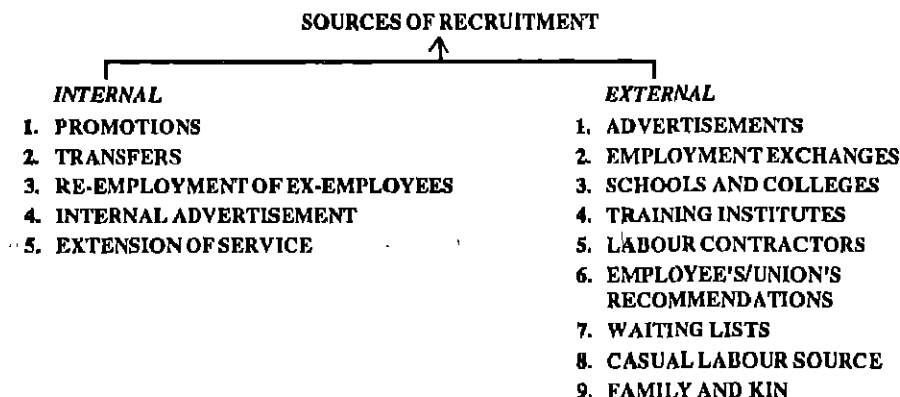


Fig. 6.1 Sources of Recruitment

employee turnover, dismissals, promotions, etc.

(iii) *Re-employment of Ex-employees* : Sometimes, organizations prefer to recall their ex-employees to man some specific job positions. In certain cases, the ex-employees themselves seek employment again. Employers may prefer this source as they know the employee's past performance and attitude.

(iv) *Internal Advertisement* : Sometimes employees belonging to various departments are invited for filling a vacancy in a newly created department or an existing department. This method is called internal advertisement.

(v) *Extension of Service* : Certain organizations follow the practice of extending the service of certain employees beyond the age of retirement. This is done primarily in the organizational interest, so as to have the advantage of long, experienced, and loyal service of the employees concerned.

External Sources

(i) *Advertisements* : Some of the widely used recruitment means are advertising in newspapers, radio, and TV, and in trade and technical journals. Sometimes, when qualified and experienced persons are not available from other

sources, advertisements are made. A well-thought-out and carefully planned advertisement of a vacancy discourages unqualified people from applying.

(ii) *Employment Exchanges* : These are the main agencies for public sector employment. The private sector employers may also make use of these facilities. They are found in all the states in India. Job-seekers can register themselves with these exchanges, indicating their qualifications and job preferences. On need, an employer writes to the exchange, which then sends the names of a number of candidates, out of whom the employer may select as per his requirement.

(iii) *Schools and Colleges* : Some schools and colleges offer job-oriented or vocational courses and have regular placement cells. Even for non-vocational courses, sometimes there is a demand from industry for certain recruitments. The employers directly conduct interviews and make selections.

(iv) *Training Institutes* : For lower-level positions Industrial Training Institutions (ITIs) are a good source of recruitment.

(v) *Labour Contractors* : In many industries there are contractors who make labour available to employers in return for commission or otherwise.

(vi) *Employee's/Union's Recommendations* : This is a good source from which employees may be drawn. They may be asked for recommendations largely as a matter of courtesy, cooperation, or in dire need. However, the employer should be careful in resorting to this source, lest workers form cliques and indulge in uncooperative activities.

(vii) *Waiting Lists* : Many organizations rely more on their own application files. These records list individuals who have indicated their interest in the job, either by visiting the employer and submitting application or they may be applicants who were kept on the waiting list in the earlier selection exercises. Such records prove very useful if they are kept up-to-date.

(viii) *Casual Labour Source* : Sometimes, certain labourers present themselves daily at the factory gate. Quite a few employers rely on this source to some extent. But this source is not quite certain.

(ix) *Family and Kin* : Sometimes, hiring of relatives is an obvious choice with some employers, especially in smaller factories. This source is resorted to particularly when loyalty is the key consideration.

6.5.3 *Relative Importance of Direct Recruitment through Employment Exchanges*

Employment exchanges are a very important source of recruitment in India. The setting up of such exchanges in India has been helpful in preventing various abuses associated with recruitment through jobbers (contractors). This is also an efficient system of recruitment for skilled and semi-skilled jobs; and perhaps, also for recruiting unskilled labour.

It may be noted that while recruiting all categories of workers and supervisors, etc., (except top management personnel) it is necessary to comply with the provisions and rules under the Employment Exchange (Compulsory Notification of Vacancies) Act, 1959. This law applies

to all establishments including factories and offices, etc., in the public as well as the private sector. This law puts an obligation on all employers to notify all vacancies in their establishments to an employment exchange. But in the case of the private sector it does not impose an obligation to actually employ through employment exchanges. In the public sector establishments, it is compulsory to employ from among those referred by an employment exchange up to a certain stage.

Even in the case of the private sector however, it is desirable to recruit employees through the employment exchanges. They help employers in filling vacancies as quickly as possible. The time-lag between the occurrence of vacancies and their filling is shortened. The employers also have an opportunity to choose the right man for the right job through these exchanges. An employment exchange can act as a very powerful agency in informing people about jobs in various occupations. It thus works like a computer in matching job specifications with the available skills. Whenever a vacancy is notified, the employment exchange selects those employment seekers who possess the required qualifications, experience, etc. This matching exercise is an invaluable function of these exchanges. If the employer performs this function by itself by setting up its own computer system, it will be very expensive.

Employment exchanges also help in reducing bribery and corruption in recruitment. They can also enhance the mobility of labour by directing the surplus labour of an area to move to places where labour is in short supply.

We thus notice that employment exchanges serve as a very useful source of recruitment for both employers and workers.

6.6 *Methods of Wage Payment*

Wage, generally speaking, is the most common method of compensating workers for their work.

This is also referred to as the direct compensation. Precisely speaking, the wage is the remuneration payable to a worker employed on the fulfilment of his duties. The wage that a worker gets for his work, acts as the most important incentive to him, because his family's standard of living depends upon it. Even for the employer, the amount paid to employees as wages is crucial as it is an important component of the cost of production. The employer is also concerned about an appropriate method of wage payment since it has a direct effect on the efficiency of his employees. No amount of welfare measures can satisfy workers if the method of their wage payment is inappropriate. Therefore, it is important that the method of wage payment should be such as will (i) attract the employees of the necessary skill, (ii) encourage them to give better performance, and (iii) retain their service with the organization over a long period of time. There are two principal methods of wage payment: (i) time-rate method; and (ii) piece-rate method. Let us look at each of these systems.

Time-rate or Day-wage Method : Under this system, a worker is paid a certain sum for a specified period of time, that is, so much per hour or week or month. This is the oldest system of wage payment. Wages are paid to the employee irrespective of the quality of work done. The supervisor notes the time for which the employee has worked, which helps in determining the wages. The formula for calculating wages under this system is —

$$\text{Total Earnings} = \text{Number of hours or days worked} \times \text{Rate per hour/day}$$

This system is most prevalent in the engineering and processing industries. It is also used for payment of wages to clerical, supervisory and managerial personnel. In such cases, there is no rigid standardization of work, but the use of certain amount of skill is involved.

Piece-rate Method : This system is also known as the payment-by-results system. Under this system the employee's wage is related to the

number of units produced or jobs completed by him. This system also has been known for a long time, and is widely practised too. The piece rate is usually developed on the basis of the average employees' past performance per unit of work. The formula for calculating wages under this system is —

$$\text{Wages} = \text{Units produced} \times \text{Rate per unit}$$

6.6.1 Difference between Time-rate and Piece-rate Methods

The two methods of wage payment can be distinguished on the following bases:

(i) **Basis of Wage Determination :** Under the time-rate method, the basis of wage determination is the time which the employee spends on his work. In the case of piece-rate method, wages are determined on the basis of number of units produced or jobs completed by the worker.

(ii) **Linkage with Efficiency :** The time-rate method does not provide any incentive to the employee for efficiency. Two workers— one efficient and the other less efficient—get the same amount of wages for the work done during the same time. Under the piece-rate method, however, wages are linked with efficiency. Those who produce more get more wages and vice versa. This method, therefore, enhances labour efficiency.

(iii) **Nature of Supervision :** Under the time-rate method, close and continual supervision becomes necessary. This is essential to ensure that the best use of time is made by the employees both in terms of the quantity and the quality of the work performed. The degree of supervision required is reduced when workers are paid on the piece-rate basis. This is so because workers will be paid on the basis of work performed, and only if their performance is of the prescribed quality. In their own interest, they adhere to the instructions issued by the employer.

(iv) **Suitability :** The time-rate system is more suitable in case the work is not tangible

measurable, for example, repair jobs, miscellaneous office duties, drafting, etc. The piece-rate method is more suitable in the case of repetitive and more standardized work.

6.6.2 Advantages and Disadvantages of Time-rate Method

Advantages : The main advantages of the time-rate method are as follows:

(i) *Simplicity* : The time-rate method makes calculation of wages easy. It is not quite necessary to keep record of the number of units produced or jobs performed. Only the time devoted by the employee is required to be recorded.

(ii) *Predictable and Steady Earnings* : The employees know in advance what their likely earnings are for the future. It helps them to plan their income and expenditure better.

(iii) *Better Quality* : The employees are in no hurry to rush to reach a particular level of output. Whatever be the output, their wages are assured. They can concentrate on the quality of their performance. That is why workers in the design section or the tool room section are paid on the time-rate basis. This is so because their work is of creative nature and requires greater concentration.

(iv) *Reduces Wastage* : Since employees are in no hurry, they handle tools and materials carefully. This reduces wastage of materials and tools.

(v) *Beneficial to Beginners* : Beginners may take more than the usual time in attaining the expected level of performance. This method, by ensuring guaranteed wages, helps in boosting their morale.

Drawbacks: The time-rate system suffers from the following drawbacks:

(i) *Encourages Inefficiency* : This method places more stress on the time spent and ignores the performance. Efficient workers, therefore, get discouraged because they are paid equivalent

to their inefficient counterparts. Thus, this method becomes a disincentive to better performance.

(ii) *Longer Work Process* : The work process gets unduly prolonged because the workers earnings are based on the time spent.

(iii) *Greater Need for Supervision* : The time-rate worker has no incentive to improve quantity and quality of the units produced or jobs performed. Therefore, greater need for supervisory control arises so as to make the best use of the employees. This adds to the cost of production.

6.6.3 Advantages and Drawbacks of Piece-rate Method

Advantages: The advantages of piece-rate method of wage payment are as follows:

(i) *Increases Productivity* : This system provides an incentive to employees to give more output.

(ii) *Reward for Efficiency* : Meritorious and talented employees are appropriately rewarded as they are paid on the basis of results. This motivates them to show a high degree of efficiency.

(iii) *Stability in Labour Cost* : This method ensures more effective cost control. The measurement of labour cost becomes easy in the case of this method. The management thus can be more flexible in decision-making because the impact on cost can be known with greater certainty.

(iv) *Reduces Supervision* : Workers in their own interest complete the jobs in the least possible time. This reduces the need and the cost of supervision.

(v) *Less Scope for Delays and Go-Slow* : Delays through breakdowns and go-slows get discouraged. Workers in their own interest help the management in managing many incidental problems, like getting machines repaired, helping in procuring raw material, etc.

Drawbacks

(i) *Insecurity* : If the production process is interrupted by the factors for which the workmen are not responsible, their earnings are reduced. This increases insecurity for workmen. That is why, sometimes, a guaranteed time-rate is given to piece-rate workers.

(ii) *Possibility of Decline in Quality* : Workers remain eager to produce more. This may affect the quality of performance. This also increases the need for greater supervision, which adds to the cost.

(iii) *Greater Spoilage* : In an effort to produce more, the workers may not give sufficient attention to spoilage of tools and materials.

(iv) *Not Suitable for Beginners* : Those workers who have just begun their work, or those who are less than average, get demoralized if wages are paid on the piece-rate basis.

(v) *Excessive Fatigue* : Workers may resort to over-strain and overwork, which adversely affects their health. The possibility of accidents also increases.

6.6.4 Suitability of Time-rate and Piece-rate Methods

Time-rate Method : The time-rate method of wage payment is more suitable in the following circumstances:

(i) Where the work cannot be easily measured e.g. repair jobs.

(ii) Where the product quality is the main consideration e.g. electric installation die-cutting, pipefitting, etc.

(iii) Where the work involved is unskilled, such as sweeping, cleaning, etc.

(iv) Where the worker is a beginner.

Piece-rate Method : The piece-rate method of wage payment is preferable in the following circumstances:

(i) When the operations are simple and can be steadily performed by an individual workman.

(ii) When it is easy to measure the output of the workman.

(iii) When a proper inspection system to check the quality of performance as well as the wastage of materials and tools exists.

(iv) When the supply of materials and other inputs is steady and constant.

6.7 Law relating to Age, Hours of Work, Holidays, and Leave

For every factory manager, the Factories Act 1948 is perhaps the most important law to understand. This Act lays down obligations for all occupiers of factories to follow the various provisions contained in it. The provisions of this Act relating to health, safety, and welfare have been outlined in the next chapter. In this section we shall state the provisions of this law relating to age, hours of work, holidays, and leave.

6.7.1 Provisions relating to Age

On the basis of age all factory workers are divided into three categories—adults, adolescents, and children. 'An adult' is defined as a person who has completed his eighteenth year of age. 'An adolescent' means a person who has completed his fifteenth year of age but has not completed his eighteenth year. 'A child' is defined as a person who has not completed his fifteenth year of age. In this connection the term 'young person' is also important. A young person is one who is either a child or an adolescent.

The law relating to age is important for the purpose of knowing various restrictions that have been put on certain persons in relation to their working in factories. For example a person who has not attained the age of fourteen years is not allowed to work in a factory. Likewise, a child worker is not allowed to do work in any part of a factory for pressing cotton in which a cotton opener is at work. Also, a child between the fourteenth and the fifteenth year of age or an adolescent is not to be employed unless he is

certified by a certifying surgeon as fit for work in a factory. Certifying surgeons are appointed by the Government under the Factories Act 1948.

6.7.2 *Provisions relating to Hours of Work*

In relation to hours of work in a factory the main provisions of the Factories Act 1948 may be noted as under:

(i) No adult worker is allowed to work in a factory for more than 48 hours in a week. Daily hours of work should not exceed 9 hours a day. The total number of hours of work in a factory shall not spread over more than ten and a half hours in any day inclusive of the rest interval.

(ii) The periods of work of adult workers in a factory each day shall not exceed five hours at a stretch. And no worker shall work for more than five hours before he has had an interval of rest of at least half an hour.

(iii) In every factory there shall be displayed a notice of hours of work for adults showing clearly for every day the periods during which adult workers may be required to work. An adult should not be asked to work in a factory otherwise than in accordance with the notice of periods of work displayed in the factory.

(iv) Women workers are not to be required to work in any factory except between 6 a.m. and 7 p.m.

(v) No child shall be employed (a) for more than four and a half hours on any day, and (b) during the night or between 10 p.m. and 6 a.m. The period of work for all children employed in a factory is also not to be spread over more than two shifts of five hours each. Each child shall be employed in only one of the relays which shall not be changed more frequently than once in a period of thirty days.

(vi) No female child shall be allowed to work in any factory except between 8 a.m. and 7 p.m.

6.7.3 *Distinction between Holiday and Leave*

A 'holiday' refers to a day on which doing of the usual work is exempted. The Oxford dictionary defines a 'holiday' as "a day on which ordinary occupations of an individual or a community are suspended; a day of exemption or cessation from work". A 'leave', on the other hand, is the exercise of a right by an employee to get exemption from work. The exercise of this right may be accompanied by wage payment or without it, depending upon the leave rules of the organization to which he belongs.

We may note that in the case of a holiday the initiative to grant exemption is usually taken by the employer. In the case of leave the initiative is usually from the side of the employee. Secondly, a holiday is usually a paid holiday. A leave, on the other hand, could be anything fully paid or unpaid or with a half pay. Thirdly, on a holiday usually the entire activity of the employer is suspended. In the case of leave the usual activity of the employer generally is not suspended. Fourthly, a leave has always to be applied for to be sanctioned by the sanctioning authority. In the case of holiday there is no such requirement. Fifthly, a holiday is usually allowed by way of a compulsion—legal or social. Leaves may be granted by way of legal compulsion, but may also be given at the discretion of the employer.

6.7.4 *Law relating to Holidays*

The Factories Act 1948 provides for a weekly holiday for all factories. It is provided that the first day of the week, i.e., Sunday, shall be a weekly rest day. However, employers are given the option to substitute for it any of the three days preceding or following it. This is subject to the condition that there must not be more than ten days' continuous work. In case a factory has been exempted from granting regular weekly holidays, it must allow compensatory holidays. Such a holiday must be allowed during the month

in which holidays were due, or within two months immediately following the month.

Apart from weekly holidays provided by the Factories Act, there are some more paid holidays enjoyed by workers in India. The number of such holidays, however, differs from State to State. Many States have passed their Industrial Establishment (National and Festival Holidays) Acts. The number of such holidays varies from four to eight in different States. The holidays include the three national holidays and the remaining as festival holidays.

6.7.5 Law relating to Leave

The Factories Act 1948 provides for annual leave with wages. These are also referred to as 'earned leave'. They are admissible to all workmen governed by this law. These leave can be accumulated also. The broad rules relating to these leaves are as follows:

(i) Every workman who works for 240 days in a calendar year is allowed an annual leave with wages at the rate of one day for every 20 days of work performed if he/she is an adult. The rate is one day for every 15 days of work performed if the worker is a child.

(ii) The annual leave with wages can be carried forward up to 30 days by adult workers and up to 40 days by child workers. Leave sought but refused can be carried forward to any limit.

(iii) A worker may apply in writing to the manager of the factory at least 15 days before the date on which he wishes to avail himself of any leave allowable to him.

(iv) A worker who has been allowed leave for four days or more in the case of an adult and five days or more in the case of a child, shall be paid, before his such leave begins, the wages due for the period of leave allowed.

6.8 Law relating to Minimum Wages

The fixation of minimum wages is one of the several methods of wage determination in India.

The law relating to fixation of minimum wages is laid down in the Minimum Wages Act 1948. This law is a Central law, which imposes obligations on all appropriate Governments (which can be the Central or the concerned State Government depending upon its jurisdiction) to fix and revise minimum wages for workers. The philosophy of this Act is prevention of exploitation of labour through low wage payment. To achieve this goal, wage cannot be left to be determined by the market forces. Instead, the Government is obliged to fix the floor wage in those industries where labour organization is non-existent or weak. Such industries are known to employ sweated labour or labour which is prepared to work at very low wage rates.

The Minimum Wages Act does not apply to all employments but only to those which appear in the list of employments contained in the schedule appended to the Act. Some of the employment covered are woollen carpet-making, wool-cleaning, *beedi*-making, shawl-weaving, rice mill, *dal* mill etc. However, the appropriate Government has been given powers to extend the provisions of this Act. This extension can be for any employment in which it thinks that the minimum wages should be fixed. Interestingly, a large-scale use of this power has been made by the appropriate Governments and most employments have been covered under the Act.

'Minimum wage' has not been defined in the Minimum Wages Act. It has been left to be determined by the wage fixing authority. It is important to note that in underdeveloped countries where large-scale unemployment prevails, unorganized labour may be available on starvation wages. The State, however, cannot encourage starvation wages in a modern democratic welfare state. Hence the need for fixation of minimum wages. But, what if an employer is unable to pay the minimum wage to its workers. The Supreme Court of India has clearly said that such an organization has no right to exist and

should better close down. This thinking has guided the fixation and revision of minimum wages in India.

Based on the above arguments, it is opined that a minimum wage should provide not only for bare subsistence of life but also for the preservation of the efficiency of the worker. It must also provide for some measures of education, medical requirements, and other amenities.

We may now state the main provisions of the Minimum Wages Act:

(i) The appropriate Government can follow any one of the following methods of minimum wage fixation:

(a) *Appointment of Committees* : Under this method, the appropriate Government appoints committees and sub-committees to hold enquiries and advise the Government in fixing rates of minimum wages. In each State a State Advisory Board is established for coordinating the work of these committees. A Central Advisory Board has been established for advising the Central and State Governments and for integrating the work of various State Advisory Boards. After the committee makes recommendations, the appropriate Government accepts or modifies them and fixes the minimum rates of wages. The rates are then published in the Government's Official Gazette.

(b) *Gazette Notification* : Under this method the Government makes a notification in its Official Gazette whereby it publishes the rates of minimum wages. Persons who have any objections to these rates are expected to submit them with the Government within two months. After considering the objections, the appropriate Government issues notice of fixation or revision of the wage rates. The rates are then published in the Official Gazette.

(ii) The appropriate Government must review the minimum rates of wages and revise, if

necessary, at an interval not exceeding five years.

(iii) Minimum rates of wages may be fixed for —

- (a) time-work, known as minimum time-rate;
- (b) piece-work, known as minimum piece-rate;
- (c) employees employed on piece-work, in the form of a 'guaranteed time-rate' (This is the minimum which is payable to every piece-rate worker irrespective of number of pieces produced);
- (d) over-time work done by employees, known as an 'over-time rate'.

(iv) The appropriate Government can fix minimum rates of wages for —

- (a) different scheduled employments;
- (b) different classes of work in the same employment;
- (c) adults, adolescents, children, apprentices; and
- (d) different localities.

(v) Minimum rates of wages may be fixed by any of the following wage periods:

- (a) by the hour, (b) by the day, (c) by the month, or (d) by a longer period.

(vi) The minimum wage rate fixed or revised may consist of:

- (a) a basic wage rate to be adjusted in accordance with the variations in the cost of living index number;
- (b) a basic wage rate with or without a cost of living allowance and the cash value of concessions in respect of supply of essential commodities at concessional rates; or
- (c) an all-inclusive rate, allowing for the basic wage rate, the cost of living allowance, and the cash value of concessions, if any.

(vii) Minimum wages must be paid in cash. The appropriate Government may, however, permit payment of minimum wages wholly or partly in kind.

(viii) The appropriate Government may—

- (a) fix the number of hours of work for a normal working day;
- (b) provide a day of rest in every period of seven days; and
- (c) provide for payment for work on a day of rest at a rate not less than the over-time rate.

(ix) The appropriate Government is empowered to exempt any employer from its liability

under the Act, if it thinks so for any special reasons.

(x) The Act provides for the appointment of an authority to hear and decide claims regarding the payment of less than the minimum rates of wages. This authority is expected to decide the cases more expeditiously than ordinary courts. It is also expected to be situated closer to the industrial centres.

(xi) An employer who pays to an employee less than the minimum rates of wages fixed or due under the Act is liable to fine and punishment. He may be punished with imprisonment up to six months, or with fine which may extend to five hundred rupees or with both.

SUMMARY

1. Meaning of Workman

A workman is a person employed in industry to do any skilled, unskilled, or technical work in return for remuneration.

2. Different Types of Workmen

On the basis of work done, workers may be divided into three types: unskilled, skilled, and semi-skilled. An unskilled worker is one who need not acquire any skill, by training or otherwise, to perform his work. A skilled worker is one who has acquired some skill through education, training, practice or experience. A semi-skilled worker is one who has acquired a less degree of skill.

3. Distinction between Skilled and Unskilled Workers

There are four bases of distinction between skilled and unskilled workers. They are:

- (i) Acquisition of skill.
- (ii) Application of brains.
- (iii) Technical knowledge.
- (iv) Price of work.

4. Recruitment

Recruitment refers to the process of identifying the prospective employees and, stimulating and encouraging them to make application for a particular job in an organization.

5. Sources of Recruitment

Sources of recruitment can be divided into two: (i) internal, and (ii) external. The internal sources are: (i) promotions, (ii) transfers, (iii) re-employment of ex-employees, (iv) internal advertisement, and (v) extension of service. The external sources are: (i) advertisements, (ii) employment exchanges, (iii) schools and colleges, (iv) training institutes, (v) labour contractors, (vi) employees'/union's recommendations, (vii) waiting lists, (viii) casual labour source, and (ix) family and kin.

6. Relative Importance of Direct Recruitment through Employment Exchange

Employment exchanges help employers in filling up vacancies as quickly as possible. They work like a computer in matching job requirements with the available skills.

7. Modes of Wage Payment

There are broadly two methods of wage payment: (i) time-rate system, and (ii) piece-rate system. Under the time-rate method, the worker is paid a certain sum of money for a fixed period, irrespective of his output. In the case of piece-rate system, wages are paid on the basis of the number of units produced or jobs performed. The two methods can be distinguished on the basis of: (i) wage determination, (ii) linkage with efficiency, (iii) nature of supervision, and (iv) suitability.

8. Advantages and Disadvantages of Time-rate Method

The main advantages of the time-rate method are: (i) simplicity, (ii) predictable and steady earnings, (iii) better quality, (iv) reduced wastage, and (v) beneficial to beginners. Its main drawbacks are: (i) possibility of encouragement to inefficiency, (ii) longer-work process, and (iii) greater need for supervision.

9. Advantages and Drawbacks of Piece-rate Method

The main advantages of the piece-rate method are: (i) increased productivity, (ii) reward for efficiency, (iii) stability in labour cost, (iv) reduced supervision, and (v) less scope for delays and go-slows. Its main drawbacks are: (i) insecurity to workers, (ii) possibility of decline in quality, (iii) greater spoilage, (iv) unsuitability to beginners, (v) excessive fatigue, and (v) strained inter-personal relations.

10. Law relating to Age

On the basis of age all factory workers are divided into three categories: adults, adolescents and children. An adult is a person who has completed his eighteenth year of age. An adolescent is a person who has completed his fifteenth year of age but has not completed his eighteenth year. A child is defined as a person who has not completed his fifteenth year of age.

11. Provisions relating to Hours of Work

No adult in a factory is allowed to work for more than 48 hours a week. Daily hours of work should not exceed nine hours. Women workers cannot be asked to work between 7 p.m. and 6 a.m. A child worker is not to be allowed to work for more than four and a half hours on any day, and during night or between 10 p.m. and 6 a.m. No female child shall be allowed to work except between 8 a.m. and 7 p.m.

12. Holiday and Leave

A 'holiday' refers to a day on which doing of the usual work is exempted. A 'leave' is the exercise of a right by an employee to get exemption from work.

13. Law relating to Holidays

The first day of the week shall be a weekly rest day. The employers may, however, substitute for it any of the three days preceding or following it.

14. Law relating to Leave

Every adult worker who works for 240 days in a calendar year is allowed annual leave with wages at the rate of one day for every 20 days of work performed. The rate is one day for every 15 days of work performed in the case of a child worker. Such leave can be carried forward up to 30 days by an adult worker and 40 days by a child worker. A worker must seek permission for leave 15 days before the date on which he wishes to avail himself of the leave. Each worker is to be provided with a leave book.

15 Law relating to Minimum Wages

The law relating to fixation of minimum wages is laid down in the Minimum Wages Act 1948. A minimum wage should provide not merely for bare subsistence of life, but it should also provide for the preservation of efficiency of the worker. It must also provide for some measures of education, medical requirements, and other amenities. Any of the two methods of minimum wage fixation may be followed : (i) appointment of committees, or (ii) gazette notification. The minimum wages must be reviewed at least once in five years. Different wages may be fixed for different classes of workmen. The Act provides for the appointment of authority to hear and decide claims relating to minimum wages. An employer who pays less than the minimum wages can be punished with fine and/or imprisonment.

EXERCISES**I. Objective-type Questions**

Indicate whether the following statements are true or false:

1. A manager employed in a factory is a skilled worker.
2. An unskilled worker makes application of his brain in performing his work.
3. Recruitment is an activity involving the selection of suitable workers for doing various jobs.
4. The time-rate system of wage payment increases economic insecurity in workmen.
5. Transfers are an internal source of recruitment.
6. The piece-rate system is preferable where the worker is a beginner.
7. An adolescent is a person who has attained the age of fifteen years but has not attained the age of eighteen years.
8. The Minimum Wages Act 1948 provides for revision of minimum wages once in four years.
9. An adult worker who has worked for 240 days in a calendar year is allowed an annual leave with wages at the rate of one day for ever 30 days of work done.

Short-Answer-type Questions

Define 'workman'.

What is meant by 'a semi-skilled workman'?

"Recruitment is not the selection of workmen". Comment.

List the internal sources of recruitment.

In which case is the piece-rate system suitable?

Define a 'child' and 'adolescent' and an 'adult' as per the Factories Act 1948.

What is the law relating to holidays under the Factories Act 1948?

What is meant by 'minimum wage'?

What is the law relating to working hours for child workers under the Factories Act 1948?

Essay-type Questions

What is meant by recruitment? Explain the external sources of recruitment.

Distinguish between (i) skilled and semi-skilled workers, and (ii) casual and regular workers.

Write an essay on "internal vs. external sources of recruitment".

Explain the relative importance of direct recruitment through employment exchanges.

Compare the merits and demerits of the time-rate system and the piece-rate system of wage payment.

Explain the situations in which the time-rate and piece-rate systems of wage payment are suitable.

Explain the difference between holiday and leave.

State the law relating to fixation and revision of minimum wages.

State the provisions of the Factories Act 1948 relating to annual leave with wages.

CHAPTER 7

Employment Conditions of Factory Workers and Legal Requirements

LEARNING OBJECTIVES

After going through this chapter, you should be able to —

- identify the framework of regulation of employment conditions of factory workers;
- outline the provisions relating to the health, safety, and welfare amenities of factory workers in the Factories Act 1948; and
- state the provisions of the Employees' State Insurance Act 1948, relating to the health of workers.

7.1 Introduction

The working of the factory system creates social stresses and strains. The presence of these stresses is found within the work situations as well as in the personal, family, and social life of workers. As we know, production contributes to the economic growth, which benefits the entire society. An important question that emerges is who should pay for the above-mentioned social costs of economic growth. The working of the *laissez-faire* (State non-interference) during the nineteenth century revealed conflict between the interests of employers and workers, and unwillingness on the part of employers to own these costs. The idea thus emerged that State

must intervene to protect the weaker sections of the society, especially the working class. That is why the government and the employers must bear the social costs of the manufacturing process. In this context we shall deal with certain legal requirements relating to the employment conditions of labour.

7.2 Regulation of Employment Conditions

Laws relating to working conditions of labour were passed at different stages of industrial development of different countries. In India, after the attainment of independence, the role of the State as "the protector of the working class" became more prominent. In the changed conditions of growing industrial activities and

industrial hazards, comprehensive protections were needed for workmen. It was advocated that workers must be given such amenities as will motivate them to devote their physical and mental energy, intelligence, and enthusiasm to their work. It was also believed that this would lead to greater efficiency in industrial production.

With the above-mentioned goals in mind, the Factories Act 1948 replaced the earlier law relating to the working conditions in factories. The Government made rules to provide for the implementation of the Act. Many other labour laws were also enacted in the post-Independence years to make work-life better and more honorable.

The Factories Act 1948 aims at regulating the working conditions in factories. It lays down, among others, the basic minimum requirements for ensuring the safety, health, and welfare of factory workers. Every owner must provide these facilities in his factory. For knowing the applicability of protections provided in this Act, it is important to know the definitions of 'factory' and 'worker'. We have given these definitions in Chapter 1. We noted that the Act covers all workers employed in the manufacturing process whether directly or through any agency, including a contractor and whether for remuneration or not. The Act provides penalties for any contravention of its provisions. Both the occupier and the manager of the factory concerned can be prosecuted for such contraventions. The punishment includes fine and/or imprisonment, depending upon the offence committed. The State Governments are responsible for enforcing the implementation of the Act through inspectors.

Another important law which provides for, among others, maintaining health of workers is the Employees' State Insurance Act 1948. In the sections to follow, we shall outline the key provisions of these two laws relating to the employment conditions of factory workers. Our focus will be on the aspects relating to the health,

safety, welfare and the provision of medical facilities.

7.3 Health Measures

The Factories Act 1948 provides comprehensive provisions for safeguarding the health of workers. These provisions can be outlined as under:

(i) *Cleanliness* : Every factory shall be kept clean by removing and washing of any dirt and refuse. A drainage system should be provided to remove water in case the manufacturing process results in the accumulation of water on the floor. Walls should be whitewashed at least once in 14 months. The doors and window-frames should be painted at least once in five years.

(ii) *Disposal of Wastes* : Effective arrangement should be made in every factory for the disposal of wastes arising from the manufacturing process.

(iii) *Ventilation and Temperature* : Every factory should be adequately ventilated by circulation of fresh air. Besides, such temperature as creates reasonable comfort and prevents injury to health should be maintained at the working-place. Where the nature of work carried on in the factory generates high temperature, measures should be taken to protect workers therefrom, by insulation arrangement or otherwise.

(iv) *Dust and Fume* : Sometimes the manufacturing process results in the accumulation of dust and fume, which is injurious to the health of workers. It should be prevented by the use of exhaust fans and other safeguards.

(v) *Artificial Humidification* : In certain factories humidity of the air is artificially increased. For example, this is done in industries such as cotton textiles, cigarettes-making, etc. In such cases, water should be effectively purified before it is so used.

(vi) *Overcrowding* : No room in a factory should be overcrowded so as to be injurious to workers' health. A minimum space of three hundred and fifty cubic feet per worker should

be provided in a factory constructed before the Act came into operation, i.e., 1 April, 1949. In the factories built after this date, at least five hundred cubic feet of space per worker should be provided.

(vii) *Lighting* : Insufficient lighting puts strain on eyes and increases risk of accidents. Therefore, every factory should be provided with suitable lighting, natural or artificial or both.

(viii) *Drinking Water* : In every factory wholesome drinking-water should be supplied at suitable points. In factories employing two hundred and fifty or more workers, provision should be made for cooling the drinking water during hot weather.

(ix) *Latrines and Urinals* : Every factory should provide sufficient number of latrines and urinals for male and female workers separately. These should be adequately lighted and ventilated. They should be washed and cleaned with suitable detergents or disinfectants.

(x) *Spittoons* : In every factory, sufficient number of spittoons must be provided at suitable places. These should be maintained in clean and hygienic condition. No worker shall spit within the factory premises except in the spittoons. A fine of not exceeding Rs 5 shall be imposed on whoever violates this provision.

7.4 Safety Measures

Every factory must take appropriate safety measures as provided for under the Factories Act, and the rules framed thereunder. Two sets of safety measures have been provided for in the Act: (i) those which should be provided in all factories, and (ii) those which should be provided in factories carrying on hazardous processes. The measures provided for in this regard can be outlined under the two separate heads as follows:

General Safety Provisions

(i) *Fencing of Machinery* : In every factory all dangerous and moving parts of machin-

ery, when in motion or use, should be securely fenced. Such fencing should be properly maintained and repaired.

(ii) *Work on or near Machinery in Motion* : In certain factories it becomes necessary to examine a machine in motion for lubrication or other adjusting operations. This should be carried out only by specially trained adult male workers wearing tight-fitting clothing. Women and children are prohibited from working on the moving parts of machinery.

(iii) *Employment of Young Persons on Dangerous Machines* : No young person (aged less than 18 years) is allowed to work on any dangerous machine without adequate training and supervision.

(iv) *Striking Gear and Devices for Cutting off Power* : In every factory, provision should be made for suitable striking gear for movement of driving belts of any transmission machine. Also, a suitable device for cutting off power in emergencies from the running machines should be provided. Proper locking should be provided in any device that can shift accidentally from 'off' to 'on' position.

(v) *Self-acting Machines* : No traversing part of a self-acting machine in any factory and materials carried thereon is allowed to run within a distance of eighteen inches from any fixed external structure.

(vi) *Casing of New Machines* : In all machines driven by power every set-screw, spindle, wheel, etc., shall be so encased as to prevent danger. Certain other parts of a machine have to be completely encased.

(vii) *Prohibition of Employment of Women or Children near Cotton Openers* : No women or children should be employed in any part of a factory for processing cotton in which a cotton opener is at work.

(viii) *Hoists and Lifts* : All hoists, lifts, and other lifting devices shall be of good construction, sound material, adequate strength, and free

from all defects. They should be properly maintained and examined by a competent person at least once in six months. The safe working load of each device should be clearly marked thereon and never exceeded. All lifting and transmission devices should be examined by a competent person at least once in twelve months.

(ix) *Revolving Machinery* : In every room in a factory where grinding process is carried on, the maximum safe working peripheral speed should be indicated. It should be done by permanently affixing a notice to this effect.

(x) *Pressure Plant* : In certain factories some parts of the plant or machinery are operated at a pressure above the atmospheric pressure. Effective measures should be taken to ensure that the safe working pressure of such parts is not exceeded.

(xi) *Floors, Stairs, and Means of Access* : All floors, steps, stairs, passages, etc., shall be of sound construction and be properly maintained. They should be provided with substantial hand-rails. Safe means of access to every work place should be provided.

(xii) *Pits, Sumps, Openings in Floors, etc.* : In every factory every fixed vessel, tank, pit, etc., should be securely covered and fenced.

(xiii) *Excessive Weight* : No person shall be made to lift, carry or move any load so heavy that it may cause him injury.

(xiv) *Protection to Eyes* : In some manufacturing processes there is risk of injury to the eyes from particles thrown off in the course of the process, or by exposure to excessive light. In such cases effective screens or suitable goggles shall be provided for the protection of workers.

(xv) *Precaution Against Dangerous Fumes* : In certain factories dangerous fumes are present in some chamber, tank, pipe, etc. Adequate provisions should be made for the outlet of such fumes.

(xvi) *Precautions regarding the Use of Portable Electric Light* : No portable electric light of

voltage exceeding twenty-four volts shall be permitted for use inside any chamber, tank, pit, pipe, etc.

(xvii) *Explosive or Inflammable Dust, Gas, etc.* : In certain factories, the manufacturing process produces dust, gas, fumes or vapour which can explode or ignite. Effective measures should be taken to prevent any such explosion.

(xviii) *Precautions in Case of Fire* : Every factory should be provided with means of escape in case of fire. Effective and clearly audible means of giving warning in case of fire to every person employed should be provided for.

(xix) *Safety Officers* : Safety officers are to be employed in those factories which employ 1000 or more workers, or where workers are exposed to serious risk of physical injury, poisoning, or any disease.

Additional Safety Provisions relating to Hazardous Processes

In 1987, a comprehensive amendment was made in the Factories Act to provide for additional safety measure in the factories which carry on a hazardous process. The 1987 amendment was made consequent upon the occurrence of the Bhopal Gas Disaster in 1984 in which a very large number of people were killed or disabled.

The amendment to the Act inserted the First Schedule and the Second Schedule. The First Schedule enumerates a list of 29 industries. It is provided that any process in relation to any of these industries is a hazardous process. The Second Schedule provides permissible levels of certain chemical substances in work environment. Apart from these schedules, a new Chapter IV-A was added to the Factories Act, which is entitled "Provisions relating to Hazardous Processes". We have earlier, in Chapter 2, noted some of the provisions of this new chapter—those relating to the approval of proposals for the establishment or expansion of a factory involving a hazardous process. We shall now outline some of the key

safety measures which have to be provided in regard to hazardous processes.

(i) *Compulsory Disclosure of Information by the Occupier* : The occupier of every factory where a hazardous process is carried on, shall disclose information relating to dangers and health-hazards involved. The information is required to be disclosed to (a) the workers employed, (b) the Chief Inspector of Factories, (c) the local authority concerned, and (d) the general public in the vicinity.

(ii) *Policy, On-site Emergency Plan and Disaster Control Measures* : Every occupier shall, at the time of registering the factory, lay down a detailed policy with respect to the health and safety of workers employed. He shall also draw up an on-site emergency plan and detailed disaster control measures for his factory. These are also to be disclosed to the workers and the general public in the vicinity.

(iii) *Occupier's Special Responsibility* : Every occupier of a factory involving any hazardous process shall maintain up-to-date health records of his workers. He shall also appoint persons who possess qualifications and experience in handling hazardous substances. Also, required is the provision for medical examination of every worker involved, before he is assigned any hazardous process, while he is continuing in such a job, and also after he has ceased to work on such a job.

(iv) *Permissible Limits of Exposure of Chemical and Toxic Substances* : The limits of exposure to chemical and toxic substances in the manufacturing process shall be of the value indicated in the Act (in the Second Schedule).

(v) *Workers' Participation in Safety Management* : The occupier shall set up a safety committee consisting of an equal number of representatives of the workers and the management. The committee shall help in maintaining proper safety and health at work.

(vi) *Right of Workers to Warn about Imminent Danger* : In case the workers apprehend an imminent danger to their lives or health due to any accident, they may bring such danger to the notice of the occupier, the safety committee members, and the inspector. The occupier shall take remedial steps in the case.

In respect of the above-mentioned matters very severe punishments for violations of these measures have been provided for. Whoever fails to comply with these provisions shall be punishable with imprisonment for seven years and with a fine which may extend to Rs 2,00,000.

7.5 Welfare Measures

The Factories Act 1948 provides that the following measure for the welfare of workers be made available:

(i) *Washing Facilities* : Separate washing facilities for male and female workers are to be provided.

(ii) *Facilities for Storing and Drying Clothes* : Suitable provision should be made for keeping clothes of workers not worn during working hours and for drying wet clothes.

(iii) *Facilities for Sitting* : Suitable arrangement for sitting should be provided for all workers who are obliged to work in a standing position.

(iv) *First-aid Appliances* : In every factory first-aid boxes with prescribed contents should be provided. There shall be one such box for every one hundred and fifty workers. An ambulance room (sick room) is to be provided in every factory where more than five hundred workmen are employed.

(v) *Canteens* : Where a factory employs more than two hundred and fifty workers, a canteen shall be provided. The canteen shall make available foodstuffs at the prescribed charges.

(vi) *Shelter, Rest Rooms, and Lunch Rooms* : In every factory where more than one

hundred and fifty workers are employed, adequate shelters, rest rooms and lunch rooms are to be provided. Workers can also take their meals there.

(vii) *Creches* : In factories where more than thirty women workers are employed, a suitable room should be provided for the use of children of such women, who are under the age of six years. Such a room should be under the charge of trained women to be provided by the employer.

(viii) *Welfare Officers* : In every factory wherein five hundred or more workers are employed, the occupier shall employ the prescribed number of welfare officers. The Government has laid down the duties and qualifications of welfare officers.

The above-mentioned welfare measures which are provided for in the Factories Act are called statutory welfare measures. Over and above these, some progressive employers may voluntarily provide for the employees additional welfare facilities like housing facilities, leave travel facilities, educational facilities, etc. Likewise, an employer may provide, on his own, a canteen for his employees even though he employs fewer than 250 workers. Such facilities are known as voluntary welfare measures.

7.6 Health Provisions Under the Employees State Insurance Act 1948

The passing of the Employees State Insurance Act 1948 (ESI Act) is a pioneering attempt to provide medical facilities and sickness benefits for workers during their period of sickness. This Act provides a scheme which is administered by the ESI Corporation. The scheme applies to those

employees who work in factories and certain other establishments. It covers employees who get salary up to Rs 3000 per month. The scheme is funded by the contributions from employers and employees. The employer's rate of contribution is 4 per cent of the total wage bill and every employee contributes 1.5 per cent of his wages. The scheme offers the following six benefits:

- (i) Medical benefit.
- (ii) Sickness benefit.
- (iii) Disablement benefit.
- (iv) Dependants' benefit.
- (v) Maternity benefit.
- (vi) Reimbursement of funeral expenses.

The scheme provides for medical care through dispensary system. Seriously ill or injured employees are treated in ESI hospitals. During sickness, an employee gets medical care as well as cash sickness benefit, which is roughly half of the actual wages of the person concerned. In case of need, even artificial limbs, dentures, spectacles are provided free or at nominal cost. Even pathological and radiological facilities are available in ESI hospitals and dispensaries. Women employees are entitled to maternity benefit also, which is given for 12 weeks in case of child births. The benefit is equal to roughly the actual wage of female employee concerned.

Interestingly, even the members of the family of the concerned employees are entitled to get medical care at ESIC hospitals and dispensaries. When a worker crosses the salary limit of Rs 3000 per month, he becomes disentitled to all the benefits.

SUMMARY

1. Regulation of Employment Conditions

The Factories Act 1948 is the principal law which regulates the working conditions of factory workers in India. It lays down the basic minimum requirements for ensuring the safety, health, and welfare of factory workers. The Employees State Insurance Act 1948 also provides for measures for maintaining the health of workers. Certain welfare measures can be provided by employers voluntarily, without there being any legal obligation on their part to do so.

2. Health Measures

The health measures provided for under the Factories Act relate to: (i) cleanliness; (ii) disposal of wastes; (iii) ventilation and temperature; (iv) dust and fume; (v) artificial humidification; (vi) overcrowding; (vii) lighting; (viii) drinking-water; (ix) latrines and urinals; and (x) spittoons.

3. Safety Measures

Two sets of safety measures are provided in the Factories Act: (i) those which are applicable to all factories; and (ii) those additional measures which are applicable to factories that carry on any hazardous process.

The safety measures which all factories must provide relate to: (i) fencing of machinery; (ii) work on or near machinery in motion; (iii) employment of young persons on dangerous machines; (iv) striking gear and devices for cutting off power; (v) self-acting machines; (vi) casing of new machinery; (vii) prohibition of employment of women or children near cotton openers; (viii) hoists and lifts; (ix) revolving machines; (x) pressure plant; (xi) floors, stairs, and means of access; (xii) pits, sumps, openings in floors, etc.; (xiii) excessive weight; (xiv) protection to eyes; (xv) precaution against dangerous fumes; (xvi) precautions against the use of portable electric light; (xvii) explosive or inflammable dust, gas, etc.; (xviii) precautions in case of fire; and (xix) safety officers.

The additional safety measure to be provided in relation to hazardous processes relate to: (i) compulsory disclosure of information by the occupier; (ii) policy and on-site emergency plan and disaster control measures; (iii) occupier's special responsibility; (iv) permissible limits of exposure of chemical and toxic substances; (v) workers' participation in safety management; and (vi) right of the workers to warn against imminent danger.

The Factories Act provides for penalty for violating the provisions of the Act. But very severe punishment and fines can be inflicted for violating safety provisions relating to hazardous processes.

4. Welfare Measures

The welfare measures provided for under the Factories Act relate to: (i) washing facilities; (ii) facilities for storing and drying clothes; (iii) facilities for sitting; (iv) first-aid appliances; (v) canteens; (vi) shelters, rest rooms, and lunch rooms; (vii) creches; and (viii) welfare officers.

5. Health Provisions under the ESI Act 1948

The main health measure provided by the ESI Act are medical facilities and cash benefits in the form of sickness benefit and maternity benefits for female workers in case of child birth. Other benefits provided for under the ESI Scheme are: disablement benefits, dependents benefit, and reimbursement of funeral expenses. The ESI Scheme is a social insurance scheme in which funds are contributed by employers and employees.

EXERCISES

I. Objective-type Questions

Indicate whether the following statements are true or false:

1. The employers and the Government should be responsible for the social cost of manufacturing process.
2. A space of 600 cubic feet per worker should be provided in the work rooms for all factory workers.
3. Factory workers should be provided with air conditioners in work rooms.
4. Safety officers must be appointed in all factories.
5. All factories under the Factories Act are deemed to carry on a hazardous process.
6. The Factories Act requires that a canteen should be provided in every factory which employs more than 150 workmen.
7. As per the Factories Act 1948 a creche should be provided in a factory where 30 women workers are employed.
8. The Employees State Insurance Scheme provides, among others, life insurance benefit for workers.

II. Short-Answer-type Questions

1. List any five health measures required to be provided under the Factories Act.
2. What is the provision of the Factories Act relating to the overcrowding of the work place?
3. What is a hazardous process?
4. State the requirement of the Factories Act about the provision of spittoons.
5. What protection to eyes is available under the Factories Act?
6. What is the requirement of the Factories Act relating to the provision of the first-aid facilities?
7. What is the provision of the Factories Act relating to the Safety Committee?
8. What benefit is provided for under the ESI Scheme for making available medical facilities to employees?

III. Essay-type Questions

1. Give a brief outline of the health measures that must be provided for factory workers.
2. What are the welfare measures that should be provided in factories under the Factories Act?
3. What safety measures are provided for workers working in factories where a hazardous process is carried on?
4. State any seven safety measures that are provided for under the Factories Act.
5. Write an essay on Welfare Measures for Factory Workers.
6. Explain the health measures provided for under the Employees State Insurance Scheme.
7. What benefits are provided for under the Employees State Insurance Scheme?